

Photocatalogue of invertebrates of the Estuary and northern Gulf of St. Lawrence from trawl surveys (2005-2013)

Claude Nozères, Diane Archambault, and Roberta Miller

Fisheries and Oceans Canada
Science Branch, Québec Region
Maurice Lamontagne Institute
PO Box 1000, 850 route de la Mer
Mont-Joli, Québec G5H 3Z4

2014

**Canadian Manuscript Report
of Fisheries and Aquatic Sciences 3035**



Pêches et Océans
Canada

Fisheries and Oceans
Canada

Canada

Canadian Manuscript Report of Fisheries and Aquatic Sciences

Manuscript reports contain scientific and technical information that contribute to existing knowledge but that deal with national or regional problems. Distribution is restricted to institutions or individuals located in particular regions of Canada. However, no restriction is placed on subject matter, and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Manuscript reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is indexed in the data base Aquatic Sciences and Fisheries Abstracts.

Numbers 1-900 in this series were issued as Manuscript Reports (Biological Series) of the Biological Board of Canada, and subsequent to 1937 when the name of the Board was changed by Act of Parliament, as Manuscript Reports (Biological Series) of the Fisheries Research Board of Canada. Numbers 901-1425 were issued as Manuscript Reports of the Fisheries Research Board of Canada. Numbers 1426-1550 were issued as Department of Fisheries and Environment, Fisheries and Marine Service Manuscript Reports. The current series name was changed with report number 1551.

Manuscript reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport manuscrit canadien des sciences halieutiques et aquatiques

Les rapports manuscrits contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui traitent de problèmes nationaux ou régionaux. La distribution en est limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports manuscrits peuvent être cités comme des publications intégrales. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports manuscrits sont indexés dans la base de données Aquatic Sciences and Fisheries Abstracts.

Les numéros 1 à 900 de cette série ont été publiés à titre de manuscrits (série biologique) de l'Office de biologie du Canada, et après le changement de la désignation de cet organisme par décret du Parlement, en 1937, ont été classés comme manuscrits (série biologique) de l'Office des recherches sur les pêcheries du Canada. Les numéros 901 à 1425 ont été publiés à titre de rapports manuscrits de l'Office des recherches sur les pêcheries du Canada. Les numéros 1426 à 1550 sont parus à titre de rapports manuscrits du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 1551.

Les rapports manuscrits sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement d'origine dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Manuscript Report of
Fisheries and Aquatic Sciences 3035

2014

Photocatalogue of invertebrates of the Estuary and northern
Gulf of St. Lawrence from trawl surveys (2005-2013)

by

Claude Nozères, Diane Archambault, and Roberta Miller

Science Branch, Québec Region
Fisheries and Oceans Canada
Maurice Lamontagne Institute
PO Box 1000, 850 route de la Mer
Mont-Joli, Québec
G5H 3Z4

© Her Majesty the Queen in Right of Canada, 2014.

Cat. No. Fs 97-4/3035-PDF

ISBN 978-0-660-22101-4

ISSN 1488-5387

Correct citation for this publication:

Nozères, C., Archambault, D., and Miller, R. 2014. Photocatalogue of invertebrates of the Estuary and northern Gulf of St. Lawrence from trawl surveys (2005-2013). Can. Manuscr. Rep. Fish. Aquat. Sci. 3035: iv + 221 p.

TABLE OF CONTENTS

ABSTRACT	iv
RÉSUMÉ	iv
INTRODUCTION	1
MATERIAL AND METHODS	2
Surveys	2
Photocatalogue	2
RESULTS AND DISCUSSION	4
Stations	4
Taxa	4
Historical errors	4
Pelagic and planktonic captures	4
Names	4
Taxa groups in photos	5
Group 1: Cnidaria	5
Group 2: Echinodermata	7
Group 3: Mollusca	10
Group 4: Arthropoda	13
Group 5: Other invertebrates	15
CONCLUSIONS	18
ACKNOWLEDGEMENTS	19
REFERENCES	20
Appendix 1. Cnidaria	42
Appendix 2. Echinodermata	68
Appendix 3. Mollusca	110
Appendix 4. Arthropoda	156
Appendix 5. Other invertebrates	182

ABSTRACT

Nozères, C., Archambault, D., and Miller, R. 2014. Photocatalogue of invertebrates of the Estuary and northern Gulf of St. Lawrence from trawl surveys (2005-2013). *Can. Manuscr. Rep. Fish. Aquat. Sci.* 3035: iv + 221 p.

This report is intended to complete the information already published on the marine species in the estuary and northern Gulf of St. Lawrence. A digital image catalogue served to validate the occurrences of invertebrate taxa (excluding shrimps) collected from bottom trawl surveys conducted by the Department of Fisheries and Oceans between 2005 and 2013. Captures from 1580 stations revealed 224 taxa, of which 183 were identified to species. Images of all the captured taxa are presented in a series of appendices.

RÉSUMÉ

Nozères, C., Archambault, D. et Miller, R. 2014. Photo-catalogue d'invertébrés de l'estuaire et du nord du golfe du Saint-Laurent lors des relevés au chalut (2005-2013). *Rapp. manus. can. sci. halieut. aquat.* 3035 : iv + 222 p.

Ce rapport vise à compléter les informations déjà publiées sur les espèces marines dans l'estuaire et le nord du golfe du Saint-Laurent. L'utilisation d'un catalogue d'photos numériques a permis de valider les occurrences des taxons d'invertébrés (excluant les crevettes) recueillis lors des relevés de chalutage de fond réalisés par le ministère des Pêches et des Océans entre 2005 et 2013. Les captures provenant des 1580 stations ont dévoilé 224 taxons dont 183 ont été identifiés à l'espèce. Des photos de tous les taxons capturés sont présentées dans une série d'annexes.

INTRODUCTION

Since 1990, the Department of Fisheries and Oceans (DFO) has conducted a bottom trawl survey annually in the Lower Estuary and northern Gulf of St. Lawrence (Archambault et al. 2014). One of the principal goals of the survey is to estimate the distribution, abundance, and biomass of stocks of Atlantic cod (*Gadus morhua*), Greenland halibut (*Reinhardtius hippoglossoides*), redfishes (*Sebastes fasciatus*, *Sebastes mentella*), Atlantic halibut (*Hippoglossus hippoglossus*) and northern shrimp (*Pandalus borealis*).

In addition to providing these estimates for the targeted commercial species, these surveys collect data on a wide number of other fish and invertebrate species. In recent years, the trawl capture records have been updated and analyzed for fishes (Dutil et al. 2009, Nozères et al. 2010, Bourdages and Ouellet 2011) and for shrimps (Savard and Nozères 2013). As with fishes and shrimp, crabs and squid (northern shortfin) are individually weighed and measured. Beginning in 2005, a concentrated effort was undertaken to examine all remaining invertebrates (Lévesque 2009). The complete treatment of invertebrates has since become an integral part of the multispecies survey. While the identity of fishes and shrimps in the study area is now well-established, the identification of most other invertebrate taxa remains a challenge.

Brunel et al. (1998) produced the most important and complete taxonomic catalogue of marine invertebrates for the St. Lawrence marine region (Estuary and Gulf). This report is an important reference work for the World Register of Marine Species (WoRMS, <http://www.marinespecies.org>), one of the principal authorities for marine taxa. However, as a resource for the cruises, this document is problematic because it contains many more species of invertebrates than are seen on surveys. Numerous species in their report would have been captured using benthic (e.g., grabs and corers) or planktonic (e.g., nets) sampling gear. Megabenthic species sampled with a bottom trawl would constitute only a portion of the listed fauna in their catalogue, and thus the need to document these groups for the surveys.

This report is a first step towards making the data public, by listing the trawl-captured invertebrate taxa with their current standard taxonomies (WoRMS) and our identifications to date. An additional purpose of this report is to present photos of invertebrates as seen on surveys. For over a decade, images and identification posters from St. Lawrence surveys have been in use by biologists in Quebec and throughout the Atlantic provinces (current versions: Nozères 2014, Nozères and Archambault 2014). By publishing this report, it is hoped that awareness will be improved regarding the lesser-known marine fauna in the St. Lawrence and also for the availability of images that document their presence.

MATERIAL AND METHODS

Surveys

The scientific trawl survey takes place annually in August. It covers the North Atlantic Fisheries Organization (NAFO) divisions 4R, 4S, 3Pn and the deep strata of 4T in the Gulf of St. Lawrence, as well as the estuary (Figure 1). The study area is divided into 55 strata established principally by depth. The number of fishing stations by stratum is proportional to their surface area, the smallest strata being sampled with a minimum of three stations. The allocation of stations within each stratum is determined at random from a set of georeferenced units. Since 2004, the survey has been conducted by the CCGS *Teleost*, a DFO scientific trawler. The fishing gear used is a *Campelen 1800* shrimp trawl. The trawl net mesh varies from 44 to 80 mm, with the codend having a lining of 12.7 mm. Details of fishing operation are described in Bourdages et al. (2007) and Archambault et al. (2014).

Trawl catches were examined on a conveyor belt, sorted and identified by taxon group of fishes and invertebrates, and placed into containers such as baskets, bins or trays (Figure 2). The specimens were counted and weighed by taxon group, and recorded in the survey database.

Identification of captured taxon groups was performed while at-sea using posters, guides and reference books. If a taxon could not be positively identified with on-board resources, a specimen was frozen to be examined later in laboratory at the Maurice Lamontagne Institute (MLI). All the taxonomic names were standardized with the 'Taxon Match' tool of WoRMS. In addition, images of identified taxa were posted to the Canadian node of WoRMS (CaRMS, <http://www.marinespecies.org/carms/photogallery>).

Specimens of new captured species were conserved for the MLI museum collection and serve as voucher specimens and references for taxonomic work. Currently, the collection-deposited specimens (invertebrates and fishes) have their occurrence records available on the Ocean Biogeographic Information System (OBIS, <http://www.iobis.org>, http://ipt.iobis.org/obiscanada/resource.do?r=dfo_que_mli_museum). The occurrence records of all fishes captured in the surveys are also available (http://ipt.iobis.org/obiscanada/resource.do?r=dfo_quebec_groundfish). The invertebrate capture records are to follow.

Photocatalogue

The photocatalogue has been an important tool for the identification and validation of taxa captured on the surveys since the start of the present study in 2005. The use of digital images to assist with invertebrate identification has evolved over the course of the surveys. The current practice is to photograph the whole of the sorted capture, and also any individual specimens of special interest or incertain identification (Figure 3). Whenever possible, a reference label with a printed scale, survey and station numbers and date is placed in the field of view of the image. At the end of a 12-hour work shift, the image files are transferred from the camera memory card to personal computers for

treatment. The images were then catalogued and edited using Adobe Photoshop Lightroom software, to correct images (exposure, white balance, cropping) and to add associated metadata (keywords, station, and GPS coordinates).

The process of adding metadata to files has also varied over the years. Taxa names may be written to either the keyword or the caption fields, while station names may be written to either the title or the location fields. Currently, the keyword and location fields are preferred for use. A unique station name is composed by cruise and station number. For example, TE-005-121 signifies the station 121 of Teleost survey 5. The GPS coordinates (latitude, longitude) were also written into image metadata. The purpose of the added metadata was to enable catalogue sorting and filtering of image files by information such as taxa names, station, and sampling date. This methodology enables the tracing of specimen records in the survey database to their images in the photocatalogue.

Various cameras were used to compile survey images. Waterproof models were preferred for photos of the grouped taxa in the ship's wet lab, while cameras that accepted add-on macro (generally less than 10 cm distance) lenses were also used in the dry lab under studio lighting. General information on digital techniques including equipment, metadata and workflows is available in Nozères (2011).

The review of images was done in concert with invertebrate records (excluding shrimps) in the survey database. This exercise served to:

- 1) confirm presence of taxa at a station
- 2) reveal species misidentifications at a station
- 3) reveal doubtful species identifications to be placed at a higher taxonomic level
- 4) reveal species in images recorded at a higher taxonomic level in the database

In this manner, the catalogued images were a vital reference in confirming or correcting the survey database. The polychaete worms were the exception. Often of small size, with soft bodies and damaged in the trawl, it is very difficult to confirm the species seen in photos. For the 2007-2009 surveys, specimens were examined by taxonomists in the laboratory. In these cases, the identifications by stations as recorded in the database were used to find type photos for these taxa.

The photos presented in Appendices 1 to 5 were taken on surveys from 2005 to 2013. In some cases, better photos were obtained from other regional surveys or coastal sites. Credit is given for each photographer when known. It is requested that an eventual re-use of images be clearly attributed to their source (e.g., DFO - name of photographer). More information is available by contacting the first author of this report (claudenozeres@gmail.com).

RESULTS AND DISCUSSION

Stations

A total of 1580 fishing stations were trawled between 2005 and 2013 (Figure 1), with about 180 stations per year. The station depths ranged from 40 m along the shores of the lower Estuary, the north shore of the Gulf, and the west coast of Newfoundland including the Strait of Belle Isle, and attaining 200 to more than 500 m in the Anticosti, Esquiman, and Laurentian channels. An area north of the Esquiman Channel (strata 825 and 826; Figure 1) has not been sampled because of rough bottoms unsuitable for trawling.

Taxa

The lists of the various taxa captured at each fishing station recorded in the survey database were matched to those in catalogued images from 2005-2013, resulting in 224 identified taxa, of which 183 were at the species level (Table 1). A number of taxa were only identified to the level of genus or higher, even though the likely species are known to be present in the region (Table 2). These were taxa for which a positive identification is often difficult to obtain, even by experts.

Historical errors

Table 3 lists several taxa that have been mistaken for similar species from the St. Lawrence, but not seen in captures, or are absent from the region. In certain cases, the errors may originate from the use of the guides for shoreline fauna or from other regions (e.g., United States). This list may be a useful reference when consulting earlier publications that mention invertebrate taxa from trawl surveys in or near the Gulf of St. Lawrence, particularly for troublesome groups such as the cephalopods *Illex illecebrosus* (not *Loligo pealii*), *Bathypolypus bairdii* (not *Bathypolypus arcticus*), and *Rossia* spp. (not *Semirossia tenera*).

Pelagic and planktonic captures

In addition to macrobenthic organisms, the bottom trawl may occasionally sample pelagic or planktonic organisms during its descent and ascent through the water column. These taxa are listed in Table 4. Since the surveys are oriented towards macrobenthos and demersal fishes, it is important to alert data users as to the presence of these species which are not typical of the sea bottom (e.g., jellyfishes) or are too small to be reliably captured (e.g., amphipods).

Names

One of the challenges with identifying invertebrates is the continual revision of names and phylogeny of taxa. Resources and databases should be periodically examined and updated to ensure current and historical names are followed. Indeed, several survey-captured species have undergone taxonomic changes in recent years. To assist with the tracing of names recorded in earlier reports and datasets, Table 5 lists the currently

accepted taxonomic names, with their synonyms along with the common names when known. The taxonomic names were obtained from WoRMS. Note that apart from commercial species, few invertebrates possess a common name. The use of the scientific name is thus encouraged.

Taxa groups in photos

For this report, the examination of taxa in photos is organized in five groups, with image examples shown in Appendices 1 to 5. Groups 1 to 4 are for the phyla Cnidaria, Echinodermata, Arthropoda, and Mollusca, respectively. The remaining taxa were placed together in Group 5 (Appendix 5), containing tunicates (Ascidacea), lamp shells (Brachiopoda), moss animals (Bryozoa), sponges (Porifera), along with polychaetes and other worms of Echiura, Nemertea, Priapulida, Sipuncula, and Turbellaria. Information about the species and issues with their identification are summarized for each of the groups.

Group 1: Cnidaria

Several of the cnidarian records remain at a general level, such as order Actiniaria for sea anemones, family Nephtheidae for small corals, and phylum Cnidaria for undetermined jellyfishes of Hydrozoa and Scyphozoa. Among the photos identified to the species were eight sea anemones, four sea pens, three soft corals, one stony coral, and six jellies (Appendix 1). Other species are expected to be revealed with expert analyses of conserved specimens.

Anthozoa (Class)

Actiniaria (Order)

A common anemone found at sites with a soft bottom, *Actinauge cristata*, is occasionally also seen attached to shells, especially of the gastropod *Colus pubescens*. This small anemone is variable in form and has been misidentified with both the lumpy, nodular *Hormathia nodosa* and the large, smooth columnar *Actinostola callosa* (Mark et al. 2010). This last anemone is regularly seen in underwater photos of deepwater stations (Provencher and Nozères 2013).

Other anemones presented in guidebooks (e.g., Fontaine 2006) are found in coastal and rocky sites, such as the plumose anemone *Metridium senile* (absent from survey captures) and the northern red or dahlia anemone *Urticina felina* (one occurrence verified in 2007). The dahlia anemone has been mistaken for the swimming anemone *Stomphia coccinea* and the mud anemone *Bolocera tuediae*. The swimming anemone is found on both rocky and soft bottoms, whereas the dahlia anemone is limited to rocky bottoms and the mud anemone to soft bottoms. A distinctive feature of the mud anemone is its deciduous tentacles (Sebens 1998), that are easily shed in the trawl and sometimes mistaken for unknown organisms. A lesser-known species, the shaggy

Liponema multicornis, is also adorned with easily-shed tentacles and has thus been frequently misidentified with the mud anemone *B. tuediae*. However, in *L. multicornis* the tentacles cover a wider oral disc and the species has a flatter column.

Occasionally seen is *Stephanauge nexilis*, an anemone that has the particularity of attaching to the upper tip of the denuded rachis of the slender sea pen *Halipteris finmarchica* (Sebens 1998).

Pennatulacea (Order)

Sea pens are soft corals that can be captured in large numbers and biomass, especially at deepwater sites, and yet these organisms remain poorly known. An example is the curved sea pen, *Anthoptilum grandiflorum*, which has long been mistaken regionally as *Pennatula grandis* (Belley et al. 2010, Mark et al. 2010). These pennatulids are large (>20 cm) and abundant organisms in the Laurentian Channel of the Gulf of St. Lawrence (e.g., Cogswell et al. 2009). Interestingly, *A. grandiflorum* is absent from the catalogue by Brunel et al. (1998). The omission might be explained by taxonomic revisions in the historical literature. This sea pen was originally named *Virgularia grandiflorum* when it was discovered off of the Gaspé Peninsula (p. 34, Whiteaves 1901). A current species, *Virgularia mirabilis*, is listed in the catalogue, citing the *Virgularia* in Whiteaves. However, *V. mirabilis* has not been identified in the region (Deichmann 1936), and the early records of *Virgularia* are likely to be referring to *A. grandiflorum*, or possibly even *H. finmarchica* which was once also placed in the genus *Virgularia*. The sea pen *H. finmarchica* is easily recognized by its very long (>1 m) and straight (not curved) rachis, but may still be overlooked in the large catches of *A. grandiflorum*.

Alcyonacea (Order)

Presently, three species of soft coral in the family Nephtheidae have been identified on the surveys: sea cauliflower *Drifa glomerata*, sea broccoli *Duva florida*, and sea strawberry *Gersemia rubiformis*. Variable in the shape and colour of their colonies, these species may be mistaken for each other, or for those of the family Alcyoniidae which are better known in the southern Gulf (e.g., *Alcyonium digitatum*, Fontaine 2006; *Anthomastus grandiflorus*, Cogswell et al. 2009). Ongoing taxonomic work may yet revise these two families, with *Gersemia* being placed in Alcyoniidae (e.g., Williams 2013). Currently, unfamiliar-looking specimens of *Duva* and *Drifa* were recorded to the family level of Nephtheidae.

Scleractinia (Order)

The only confirmed species of stony coral in captures is the cup coral *Flabellum alabastrum*, a solitary species that resides unattached on mud bottoms, usually found at the deepest stations (>300 m). Occasionally, other specimens have been recorded as corals (e.g., *Paramuricea*); however, the review of images has revealed these to be debris in the trawl netting carried over from surveys in another region.

Zoanthidea (Order)

A final group of anthozoans, zoanthids, has been identified in images. Small, club-shaped pieces of *Epizoanthus erdmanni* were classified as unknown organisms for several years until identified in 2012. A stouter, encrusting species, *E. incrustatus*, was observed once in 2007, attached to the shell of a hermit crab.

Hydrozoa (Class)

The pelagic hydrozoan medusa *Ptychogena lactea* was often seen in captures, but this small, clear-white jellyfish may also be mistaken for the hydrozoan *Staurostoma mertensii* or with scyphozoan jellyfish such as *Aurelia aurita*. Other hydrozoan species were captured in their benthic phase as polyps. With the exception of the distinctive 'bottle brush' *Thuiaria thuja*, these require expert analysis with a dissecting scope and were thus recorded under the class Hydrozoa.

Scyphozoa (Class)

Large jellyfishes may be captured by the trawl as it passes through the water column. The species are distinctive in colour and in body shape: the orange-brown or violet disk of lion's mane *Cyanea capillata*, the purple cone of merchant-bonnet *Periphylla periphylla*, and the purple disk of Wyville's jelly *Atolla wyvillei* (Calder 2009).

As many jellies belong to the class Scyphozoa, damaged or partial specimens were usually recorded to that level. However, as mentioned above, small white jellyfishes such as the moon jelly *Aurelia aurita* may be mistaken for the hydrozoans *P. lactea* and *S. mertensii*. Even when trawl-damaged, the three species may be distinguished by the characteristic shape of their gonads (Fontaine 2006, Pollock 1998, Shih 1977).

Stauromedusae (Order)

Specimens of a large species of stalked jellyfish (Stauromedusae), *Lucernaria quadricornis*, have been captured on two recent surveys (2011-2012).

Group 2: Echinodermata

The principal captures of echinoderms (Appendix 2) consisted of sea stars (Asteroidea), brittle stars (Ophiuroidea), sea urchins (Echinoidea), and the occasional sea cucumber (Holothuroidea).

Asteroidea (Class)

Of the sea stars, the family Asteriidae presents a challenge because of the number of similar species. Large, six-armed specimens were identified as the polar sea star *Lepasterias polaris*. A large, five-armed sea star, *Urasterias linckii*, was seen in 2005, previously mistaken for *Asterias rubens*, a coastal species not seen on the surveys. Small stars of the genus *Leptasterias* may be mistaken for *Stephanasterias albula*, identifiable by its asymmetric arms (usually three short, three long) with pronounced centre lines.

The blood sea stars of genus *Henricia* are similar in form, but less spiny compared to asteriid stars. The individual species are difficult to distinguish and thus the specimens were grouped here to the level of genus (Grainger 1966; Brunel et al. 1998).

For the region covered by the surveys, a number of sea stars are bathyal species that are not usually listed in shoreline guidebooks, for example the biscuit star *Ceramaster granularis*, the mud star *Ctenodiscus crispatus*, and the Arctic sand star *Leptychaster arcticus*. The essential reference in these cases is Clark and Downey (1992), which was used to correct errors in identifying *Psilaster andromeda* and *Pseudarchaster parelii*. For example, *L. arcticus* is a rare species, having been mistaken for small specimens of *P. parelii* until 2013. This reference was also useful for uncovering species of Pterasteridae, such as the purple slime star *Diplopteraster multipes*. Other slime stars were the colourful *Pteraster militaris* and the beige *P. pulvillus*. A fourth species, *Pteraster obscurus*, is recognized by its blunt arms and hexagonal shape.

In the family Poraniidae, the genus *Poraniomorpha* is a group in need of taxonomic review (Mah and Foltz 2014). Three species are currently valid and likely present: *Poraniomorpha bidens*, *P. hispida*, *P. tumida*. These stars may also be mistaken for the badge star *Porania insignis*, a species seen in the Atlantic (Martinez 2002).

Among the rarer, deepwater captures were two unusual species: the humped star *Tremaster mirabilis* and the amulet star *Novodinia americana*. The amulet star has several fragile arms attached to a central disk, but it is often captured in fragments that may be mistaken for as debris or an unknown organism.

Ophiuroidea (Class)

Several species of small brittle stars (Order Ophiurida) were captured. Deep stations (>200 m) were dominated by *Ophiura sarsii*. Another common species was *Ophiopholis aculeata*, particularly at rocky sites. The review of images has also revealed two fragile and occasional brittlestars: a burrowing *Amphiura* sp. and the spiny *Ophiacantha bidentata*, both of which were often mistaken for *O. sarsii* and *O. aculeata*, respectively. A smaller species, *Ophiura robusta*, has been captured at some coastal stations off of Newfoundland. On a few occasions, a specimen in poor condition was observed of *Ophioscolex glacialis*, which was confirmed in 2013.

Two other species of brittlestars may have been captured, however the photos were not sufficiently clear for positive identification. The species *Ophiopus arcticus* may have been mistaken on several occasions for *O. aculeata*, while *Ophiocten sericeum* may have been mistaken for *O. sarsii*.

A distinctive, small brittle star, *Stegophiura nodosa*, was only captured once at a station north of the Strait of Belle-Isle in 2012. However, this species has been captured in other surveys in the Estuary and northwest Gulf of St. Lawrence (Mark et al. 2010, B. Sainte-Marie pers. comm. 2014).

The basket stars are large ophiuroids (Order Euryalida). The common species is presumed to be *Gorgonocephalus arcticus*; a similar species, *G. eucnemis*, which lacks the spiny points on the oral disc, is also present. Captures of basket stars were therefore recorded at the genus level.

Echinoidea (Class)

Four species of urchin were present in the surveys. An irregular urchin, the heart urchin *Brisaster fragilis*, was abundant at deepwater sites, especially in the estuary. This species has occasionally been mistaken for the Atlantic species, *Echinocardium cordatum*.

Of the regular urchins, the pale sea urchin *Strongylocentrotus pallidus* is associated with deepwater sites, while the green sea urchin *S. droebachiensis* is common nearshore (Gagnon and Gilkinson 1994). However, the two species may overlap in distribution, and distinguishing the two species solely using gross external features such as coloration is not recommended (Gagnon and Gilkinson 1994). Therefore, all specimens were recorded at the genus level.

The sand dollar, *Echinarachnius parma*, is found on sandy bottoms at shallow depths, which are not common habitats in the survey area, and thus the few mentions for this species.

Holothuroidea (Class)

Occasional in captures were sea cucumbers which may be found buried, on the surface of the sediment bottom, or fixed to hard substrates. The orange-footed sea cucumber *Cucumaria frondosa* is a large, commercial species that is found on the bottom and not buried. Two burrowing species were relatively common in the surveys: the brown psolus *Psolus phantapus* in coastal zones, and the eggplant-coloured sea cucumber *Molpadia oolitica* in deep channels. The scarlet psolus *Psolus fabricii* is usually seen inshore, attached to hard substrates. It has only been captured twice, in 2006 and again in 2013.

Smaller specimens of sea cucumber may be difficult to identify. Some of the records for holothurids may instead have been soft-bodied cylindrical organisms such as burrowing anemones or echiuran worms. Other specimens may belong to the poorly-known group of dendrochirote holothurids, such as *Ekmankia barthii* and *Thyonidium* sp. (Hansen and McKenzie 1991). Two examples captured in 2013 are presented in the Appendix 2, recorded to the class Holothuroidea. A similar-looking species is the burrowing *Pentamera calcigera*, related to *C. frondosa*. A single specimen captured in 2008 from SW Newfoundland at 158 m may be present in an image. While this identification is doubtful, the species is presented here for future reference.

Crinoidea (Class)

One species of sea lily, *Heliometra glacialis*, was identified to date. The fragile specimens were recorded in earlier surveys as unknown until seen again in 2012.

Group 3: Mollusca

The molluscs (Appendix 3) were collectively one of the most diverse groups of invertebrates in the catches, with at least 20 bivalves, 27 gastropods, 4 chitons (Polyplacophora), and 5 cephalopods.

Bivalvia (Class)

While a number of bivalve species were present in captures, few of these were in abundance. This likely reflects their poor capturability with the survey trawl compared with gear used in coastal surveys (Mark et al. 2010, Bourdages et al. 2012). In some cases, photos may have recorded shells of dead or misplaced individuals; for example, specimens of wedgeclam *Mesodesma* sp. that are normally found in the intertidal and infralittoral zone, or the shells of the large freshwater mussel *Elliptio complanata*. This mussel is often misidentified when found on the shores of the St. Lawrence (e.g., Chabot and Rossignol 2003), where it is likely deposited following the spring melt of lake and river ice. In the case of *Mesodesma*, the species is likely to be *M. arctatum*. However, due to the uncertain status of a second species (*M. deauratum*), the specimens were recorded to the genus level.

Other deepwater bivalves have been misidentified with nearshore species. In one instance, a transparent small bivalve at deepwater stations, *Similipecten greenlandicus*, was often mistaken for juveniles of the Atlantic deep-sea scallop *Placopecten magellanicus*. The latter species have opaque shell valves and is found at less depth. Misidentifications have also been common between large-siphoned clams with blunt or wavy shells: the truncate clam *Mya truncata* (only seen once in 2011), the Arctic roughmya *Panomya norvegica* (occasional), and the rock borer *Hiatella arctica* (occasional). Some specimens of the Greenland smooth cockle *Serripes groenlandicus*,

have been captured. However, no photos are available in the catalogue to confirm the records for the softshell clam *Mya arenaria* and the ocean quahog *Arctica islandica*, two shallow-water species.

Some epibenthic or near-surface bivalve species were relatively abundant in captures. Examples include the hairy cockle *Ciliatocardium ciliatum ciliatum* and the Icelandic scallop *Chlamys islandica*, along with smaller species of *Megayoldia thraciaeformis* and *Astarte* sp. The astartes are a diverse group that require considerable effort to identify to the species level (Petersen 2001). Most species are small (<2 cm), with robust yellow-brown shells, with the exception of the large, black *A. borealis*. Several other bivalves may require laboratory examination to be distinguished by species, notably for the genus *Musculus*, *Mytilus*, *Cuspidaria*, and *Anomia*.

Gastropoda (Class)

Gastropods were at times abundant in captures; however, species associated with coastal and rocky habitats were absent or under-represented. Among the more common smaller gastropods were the topshells (superfamily Trochoidea). In the past, a southern species, *Calliostoma occidentale*, was misidentified in captures for the resident *Margarites* and *Solariella* topshells. The boreal rosy margarite, *Margarites costalis* and the Greenland margarite, *M. groenlandicus* may be confused with each other (e.g., Fontaine 2006), and with the similar-looking *Solariella obscura* and *S. varicosa*, although the latter two species have yet to be confirmed in survey images. It may become necessary to revise the records of topshells to the level of genus or higher (superfamily Trochoidea).

The whelks (family Buccinidae) are a challenging group to identify as the shells are highly variable in form and their taxonomy is often under revision. As a result, name changes and regroupings are frequent. For example, *Colus kroyeri* is currently known as *Plicifusus kroeyeri*, and *Neptunea brevicauda* as *Aulacofusus brevicauda*. These revisions make it difficult to group specimens, when identifications are uncertain, to the same genus level for *Colus* and *Neptunea*. For the polymorphic genus *Buccinum*, an unknown number of additional species may be present in addition to the common waved whelk *Buccinum undatum*, and thus the recommended practice of recording to the genus level. Another member of the Buccinidae, *Beringius turtoni*, has been mistaken for those of *Colus* genus. For these reasons, there may be a need to record these whelks to the level of family Buccinidae.

Similar to the whelks, the murex or trophon gastropods (family Muricidae) may be difficult to distinguish, particularly between *Boreotrophon clathratus* and *B. truncatus* with eroded shells. A third species, *Scabrotrophon fabricii* (previously *B. fabricii*), is recognizable by its spiral sculpture in addition to radial ribs. However, it was often mistaken for *B. clathratus*. All three species were usually recorded as the genus *Boreotrophon*.

Another common gastropod is the American pelican-foot *Arrhoges occidentalis*, with its distinctive shell lip or wing. However, in smaller specimens, the lip is poorly-developed relative to that seen in adults, and thus it may be broken off, leading to misidentifications for *Colus* sp.

Moon snails, family Naticidae, were occasionally captured. Several have been misidentified as the large, inshore *Lunatia heros* (also known as *Euspira heros* or *Natica heros*). Photos that show the shell opening have confirmed the presence of the arctic moonsnail *Cryptonatica affinis* (partially filled umbilicus, calcareous operculum) and the pale moonsnail *Lunatia pallida* (open umbilicus, chitinous operculum).

The bubble-shells represent a special group of gastropods with atypical shells. The giant canoe-bubble *Scaphander punctostriatus* was common and abundant in captures. This species has long been misidentified as *Haminoea solitaria*. The giant canoe-bubble was confirmed in 2012 by examining the minute striations on dried shells.

Among the rare gastropods in captures are members of the family Velutinidae. A few specimens of small veloutes, *Limneria undata* and *Velutina velutina*, have been seen during surveys. A rare and unusual velutinid of genus *Onchidiopsis* resembles a very large nudibranch due to the mantle covering its vestigial shell. Several specimens have also been captured on scallop surveys on the lower north shore (Rudman 2007, Patrice Goudreau, pers. comm. 2012, Bourdages et al. 2012). The Gulf of St. Lawrence specimens have morphological details that appear to differ from those of known species, and it may be necessary to conduct genetic analyses to confirm the species.

While sea slugs, or nudibranchs, may be common and diverse along the coast, they constitute only a small group of species occasionally seen in captures. The bushy-backed sea slug, *Dendronotus frondosus*, is an example of a well-known coastal species. In a guide of Atlantic sea slugs, Bleakney (1996) suggested that pale, large specimens found offshore are likely of *Dendronotus dalli*. This species is better known in the Northeast Pacific, which may account for the lack of mention in other Atlantic guidebooks. Thus, these nudibranchs were recorded to the genus level. Of special interest were the nudibranchs *Colga villosa* and *Doridoxa ingolfiana*. Both were captured regularly offshore but misidentified until 2012 as the coastal species *Cadlina laevis* and *Palio dubia*. Limited information on *C. villosa* may be found on websites (e.g., Nudipixel) and for *D. ingolfiana* in Just and Edmunds (1985) and Schrödl et al. (2001).

Polyplacophora (Class)

The chitons are small molluscs that attach to rocks and other hard surfaces. A few specimens have been captured that may be the mottled red chiton *Tonicella marmorea*. However, close examination is required to distinguish it from *T. rubra* and thus these specimens were recorded to the genus level. Three other species have also been captured: *Stenosemus exaratus* in 2005, *S. albus* in 2008 and 2009, and *Amicula vestita* in 2011.

Cephalopoda (Class)

Cephalopods are a diverse group in the oceans (e.g., Gardiner and Dick 2010, Vecchione and Galbraith 2001), but only five species were captured within the Gulf: one squid (Teuthida), two octopus (Octopoda), and two bobtail squids (Sepiolida).

Among squids, the northern shortfin squid *Illex illecebrosus* is a pelagic, migratory species that enters Atlantic Canadian waters from the south to feed in the summer months (Dawe and Beck 1997). As a result, it is frequently seen in the Gulf in the August surveys. A single, juvenile specimen of another squid species, the boreal armhook squid *Gonatus fabricii*, was captured in 2011, north of the Strait of Belle-Isle and thus outside of the Gulf. The longfin squid, *Loligo pealeii*, has been misreported in past decades, but this southern species is not found in the St. Lawrence (Mercer 1970).

The resident octopod in both the estuary and the Gulf is the boreal spoonarm octopus *Bathypolypus bairdii*. This species is frequently misreported in Canada and US as the Arctic spoonarm octopus *B. arcticus*, a species not expected to be found south of Labrador (Muus 2002). A pelagic, deepsea octopod is also captured on rare occasions (2005-2007, 2013), usually in poor condition when hauled in the trawl. From photo and dissections of specimens, the species has been identified as the cirrate octopod, *Stauroteuthis syrtensis*.

Bobtail squids (sepiolids) also reside in the Gulf, but are not as well-known as the other cephalopods. Sepiolids have a short body like an octopus, but with ten arms and a separate mantle like a squid. Guides intended for southern regions (e.g., Pollock 1998) have led to longstanding misidentifications for the lesser shining bobtail squid, *Semirossia tenera* (Nozères and Bérubé 2003), which is not encountered north of the Bay of Fundy. Two sepiolid species, *Rossia megaptera* and *R. palpebrosa*, occur in the Gulf (Mercer 1968), but these are not easily distinguished, and thus they were grouped to the genus level.

Group 4: Arthropoda

The arthropods seen in captures (Appendix 4) consisted of crustaceans and pycnogonids (sea spiders). The principal captures were of decapod crustaceans such as shrimps and crabs (Archambault et al. 2014), while smaller crustaceans such as amphipods were also occasionally captured.

Crustacea (subphylum)

Amphipoda (Order)

Due to their small size, motility, and oftentimes burrowing behaviour, amphipods are likely to be grossly undersampled by the trawl and are actually much more diverse and abundant relative to those found than in captures. Several suprabenthic or pelagic

species occurred regularly, notably *Eusirus cuspidatus*, *Rhachotropis aculeata*, and *Themisto libellula*. Occasionally captured were two epibenthic species, *Epimeria loricata* and *Paramphithoe hystrix*, usually associated with sea stars or sponges. Unique captures have occurred of *Oedicerus saginatus* and the skeleton shrimp (Caprellidae) *Aeginina longicornis*. Other species of Oedicerotidae or Caprellidae are likely present, but not yet documented in photos. A lesser-known species is the burrowing amphipod, *Neohela monstrosa*, captured at deepwater sites. This species was often misidentified with the similarly large amphipods *Maera loveni*, *Melita dentata*, and *Wimvadocus torelli*. However, *N. monstrosa* is unique for its dorsally compressed body, similar to that of isopods, rather than the laterally compressed form of the typical amphipod.

Isopoda (Order)

Of the isopods, only two species were seen, both of which were external fish parasites of the family Aegidae: *Aega psora* and *Syscenus infelix*. The latter species is frequently collected at deep stations accompanied by captures of its fish host, the common grenadier or marlin-spike, *Nezumia bairdii*. This large isopod has been mistaken in the past for coastal isopods of genus *Idotea*.

Decapoda (Order)

Apart from shrimps, the decapods in catches were mostly of large crabs such as the snow crab *Chionoecetes opilio*, the northern stone crab *Lithodes maja*, the toad crab, *Hyas araneus*, and the violin crab *Hyas coarctatus*. Also captured were two species of hermit crab, *Pagurus arcuatus* and *Pagurus pubescens*, recorded to the level of genus. The common rock crab, *Cancer irroratus*, is an inshore species and was only captured once, in 2006. The shrimps and crabs usually presented little difficulty for identification, and thus were only photographed when interesting specimens were noticed. In particular, two new shrimp species, *Hymenopenaus debilis* and *Plesionika martia*, were not observed and documented in photos until 2011 (Savard and Nozères 2012).

Two small decapod species with distinctive orange eyes were found at deep stations (>300 m): a galatheid crab *Munidopsis curvirostra* and the burrowing shrimp *Calocaris templemani* (Pohle 1988). This epibenthic crab was frequent in captures, while the burrowing shrimp, an endobenthic species, was rarely observed even though it may be abundant in the sediment (Gagnon et al. 2013).

Euphausiacea (Order)

Krill, as with most planktonic crustaceans, were not usually noticed in the trawl captures. The most commonly seen species was the horned krill, *Meganctiphanes norvegica*, while those of the genus *Thysanoessa* were only observed in 2012.

Mysidacea (Order)

The mysids, or opossum shrimps, are zooplankters that were rarely detected in trawl captures. The deepwater mysids of genus *Boreomysis* have distinctive red eyes, while coastal *Mysis* species, with their black eyes, were observed once in 2012.

Cirripedia (Infraclass)

The barnacles comprised two types in the captures. The first type, a stalked barnacle (Order Scalpelliformes) *Arcoscalpellum michelottianum*, is a solitary, deepsea species. It may be mistaken for the common gooseneck barnacles of genus *Lepas* that attach themselves to floating debris and whales. The other barnacles (Order Sessilia) are of more familiar type, living in compact groups on hard surfaces. The species *Chirona hameri* was occasionally captured at shallow stations and is distinguished by its relatively massive size, attaining several centimetres in width and height. Other, smaller sized barnacles were frequently seen encrusting debris (rocks and shells), and also on the carapaces of *Hyas* crabs. The variability of forms among these small barnacles (e.g., *Balanus balanus*, *B. crenatus*) hinders their positive identification in photos, and thus the need to record specimens to the level of family Balanidae.

Pycnogonida (Class)

The sea spiders are small organisms, occasionally abundant at deep stations, but many are difficult to identify to the species without a magnified view. They were all recorded to the genus *Nymphon* with the exception of the anemone sea spider, *Pycnogonum litorale*, captured in 2005.

Group 5: Other invertebrates

The remaining groups represented considerable challenges for identification. Microscope analysis is often needed for the colonial organisms of sponges (Porifera), tunicates (Ascidacea), and moss animals (Bryozoa). Soft-bodied animals such as comb jellies and worms (Polychaeta, Echiura Nemertea, Priapulida, and Sipuncula) are often damaged in the trawl and may not be readily recognizable in photos. Even more than with the preceding groups, photos of these taxa are in need of expert review, and they are presented here (Appendix 5) to assist with future discussions and efforts at their identification.

Ascidacea (Class)

The ascidians are currently the focus of a special effort. While a number of species are present natively, several others are invasive species with the potential to disrupt port and aquaculture operations, particularly *Botrylloides violaceus*, *Ciona intestinalis*, *Didemnum vexillum*, and *Steyla clava* (Martin et al. 2011). Their appearance and

distribution in the survey area is thus of interest to resource managers. Of these invasive species, only the golden sheath tunicate *B. violaceus* may have been captured in the surveys. Although considered a southern species, it has been reported from boreal marine regions such as off the coasts of Alaska (Lambert and Sanamyan 2001). The alternative would be that the specimens were of *B. aureum*, a native coldwater tunicate, but for which less is known.

The identification of several native tunicates is still to be confirmed; some possible cases are presented here. A bright orange-coloured and smooth-surfaced solitary tunicate, *Cnemidocarpa finmarkiensis*, is found in boreal waters (Van Name 1945), but it is not mentioned in Brunel et al. (1998). A frequently caught compound ascidian with gray-blue, finger-like lobes is tentatively identified here as *Eudistoma vitreum*. In the past, this ascidian was misidentified as belonging to the genus of *Aplidium* or *Distaplia*. Rare specimens of an ascidian that forms massive, spherically-lobed colonies fixed to rocks appear to be of *Synoicum pulmonaria*. Smaller and solitary spherical ascidians from deepwater stations may correspond to *Polycarpa fibrosa*.

Brachiopoda (Phylum)

Two species of lamp shells are occasionally captured. The black, parrot-beak *Hemithiris psittacea* is more commonly seen. The second species, *Terebratulina septentrionalis*, is smaller and light-coloured, with two almost-symmetrical valves, which has led to it being mistaken for small scallops or other bivalves (phylum Mollusca).

Bryozoa (Phylum)

Bryozoans are another group of diverse, colonial animals that are difficult to identify in captures. Resembling those of class Hydrozoa, the bushy or encrusting colonies may be found attached to debris or larger organisms such as the stalks of the sea potato *Boltenia ovifera*, a common native tunicate. In other instances, dead traces of calcareous species may be inadvertently recorded. Occasionally captured were colonies of *Securiflustra securifrons*, which may be recognized by its long and supple fronds; however, it has been misidentified in the past for the shorter and more rigid colonies of *Caberea ellisii* (Fontaine 2006).

Occasional large catches were seen of a bryozoan species of *Alcyonidium* which superficially resembled the long stipes of kelp seaweed. It is not known if these captures represent floating debris or live and fixed colonies before the trawl. Adding to the confusion is the occasional misspelling for *Alcyonium* which are soft corals (phylum Cnidaria). Unfortunately, both groups are also similar in form, with lobed or finger-like colonies.

Ctenophora (Phylum)

Ctenophores are gelatinous plankton, occasionally caught in sufficient abundance as to be noticed on the conveyor belt while sorting specimens. To date, only the sea gooseberry *Pleurobrachia pileus* is represented in the photos. The marble-sized spheres are not likely to be mistaken for *Mertensia ovum*, a larger, oval-shaped ctenophore, nor with jellies of Phylum Cnidaria.

Echiura (Phylum)

Echiuran worms are not readily recognisable in the trawl captures, usually retracted and thereby giving an unfamiliar appearance. Until recently (2013), the few specimens have been misidentified as unknown ascidians or holothuroids. Two species are tentatively presented here of the family Bonelliidae: *Hamingia arctica* and *Pseudobonellia iraidii*.

Nemertea (Phylum)

Nemertean worms are fragile and were rarely captured, or perhaps not noticed in catches. Nemerteans comprise a diverse group and they have not been further identified in either photos or specimens.

Polychaeta (Class)

The bristle worms, or polychaetes (phylum Annelida), present a special case. Between 2007 and 2009, a concerted effort by taxonomists revealed several species not recorded in other years. For these organisms, the expert identification recorded in the database was used as keywords tags in the catalogue even when these images were not of sufficient quality for verification. In other years, the photos did not permit for positive identification of polychaetes with the exception of the sea mouse *Aphroditella hastata*. This polychaete is easily recognized by its large size, broad rather than worm-like shape, and felt-covered dorsal surface. Nonetheless, another scaled worm, *Laetmonice filicornis*, was often mistaken for juvenile specimens of *A. hastata*.

Porifera (Phylum)

Sponges normally require microscope examination of spicules for positive identification, which is not possible at sea nor with general photos. The distinctive forms of several species were used here to give tentative identifications (see Best et al. 2010).

Priapulida (Class)

The priapulids comprise a poorly known group of segmented worms (phylum Cephalorhyncha or Priapula). A specimen of *Priapulus caudatus* was captured in 2011.

Sipuncula (Phylum)

The sipunculids, or peanut worms, were occasional in captures. Identification normally requires dissection of specimens. As seen from photos, the most likely species is *Golfingia margaritacea*. Also present was *Phascolion strombus strombus*, which occupies old gastropod shells. The shells appear as debris, filled with mud, and usually careful examination is required reveal the occupant.

Turbellaria (Class)

Long, gray coils of tough material similar to plastic-coated wires were once discarded as debris. These have been identified in 2012 as the egg cocoons of a Fecampiidae flatworm (Phylum Platyhelminthes) that are parasites of crustaceans. In the North Atlantic, *Kronborgia caridicola* infects the shrimps *Eualus macilentus* and *Lebbeus polaris* (Kanneworff and Christensen 1966). This parasite typically attaches the coiled egg cocoon to the seabottom.

CONCLUSIONS

The annual bottom trawl survey in the St. Lawrence is a considerable source of data on a variety of principally benthic, macroinvertebrate species. Historically, identifications remained at a general taxonomic level and were of uncertain reliability. The efforts of recent years have resolved many issues, resulting in consistent and efficient identifications now being performed at-sea. The verification of taxa in the survey database has been made possible because of the catalogued digital images of station captures over the period of 2005-2013. The images confirmed that deepwater, epibenthic groups of anthozoan cnidarians, decapod crustaceans, and echinoderms were well-represented, while those invertebrate groups associated with planktonic, burrowing, coastal or rocky habitats were not frequent in captures. With the continued refinement of image cataloging, the distribution, abundance and biomass data for invertebrate captures will become sufficiently reliable for ecological analyses, as is currently done with data for fish and shrimp species in the survey area.

Taken together as a whole, the bottom trawl surveys in the Estuary and northern Gulf of St. Lawrence constitute a unique and valuable source of information for establishing a historical time series of data on marine invertebrates of this inland sea, and in relation to the environmental factors prevailing there.

ACKNOWLEDGEMENTS

We thank the numerous technicians and biologists and ships crews that assisted with the sorting, photographing, and identification of captures. Special thanks to Mylène Bourque, Pierre-Marc Chouinard, Mathieu Desgagnés, Johanne Gauthier, Mélanie Lévesque, Laure de Montety, Éric Parent, Paul Robichaud, and Marilyn Thorne. Bernard Sainte-Marie, Hugo Bourdages, and Denis Chabot revised this report and helped to improve it.

REFERENCES

- Archambault, D., Bourdages, H., Brassard, C., Galbraith, P., Gauthier, J., Grégoire, F., Lambert, J., and Nozères, C. 2014. Preliminary results from the groundfish and shrimp multidisciplinary survey in August 2013 in the Estuary and northern Gulf of St. Lawrence. DFO Can. Sci. Advis. Sec. Res. Doc. 2014/010. v + 97 p.
- Belley, R., Archambault, P., Sundby, B., and Gilbert, F. 2010. Effects of hypoxia on benthic macrofauna and bioturbation in the Estuary and Gulf of St. Lawrence, Canada. *Cont. Shelf Res.* 30: 1302-1313.
- Best, M., Kenchington, E., MacIsaac, K., Wareham, V.E., Fuller, S.D., and Thompson, A.B. 2010. Sponge Identification Guide NAFO Area. *Sci. Coun. Studies* 43: 1-49. <http://dx.doi.org/10.2960/S.v43.m1>
- Bleakney, J.S. 1996. Sea slug of Atlantic Canada and the Gulf of Maine. Nimbus Publishing and the Nova Scotia Museum, Halifax, Nova Scotia.
- Bourdages, H., and Ouellet, J.-F. 2011. Geographic distribution and abundance indices of marine fish in the northern Gulf of St. Lawrence (1990–2009). *Can. Tech. Rep. Fish. Aquat. Sci.* 2963: vi + 171 p.
- Bourdages H., Savard, L., Archambault, D., and Valois, S. 2007. Results from the August 2004 and 2005 comparative fishing experiments in the northern Gulf of St. Lawrence between the CCGS *Alfred Needler* and the CCGS *Teleost*. *Can. Tech. Rep. Fish. Aquat. Sci.* 2750: ix + 57 p.
- Bourdages, H., Goudreau, P., Lambert, J., Landry, L. et Nozères, C. 2012. Distribution des bivalves et gastéropodes benthiques dans les zones infralittorale et circalittorale des côtes de l'estuaire et du nord du golfe du Saint-Laurent. *Rapp. tech. can. sci. halieut. aquat.* 3004 : iv + 103 p.
- Brunel, P., Bossé, L., and Lamarche, G. 1998. Catalogue of the marine Invertebrates of the Estuary and the Gulf of Saint Lawrence. *Can. Spec. Publ. Fish. Aquat. Sci.* 126. 405 p.
- Calder, D.R. 2009. Cubozoan and Scyphozoan jellyfishes of the Carolinian biogeographic province, southeastern USA. *Royal Ontario Museum Contributions in Marine Science* 3: 1-58.
- Chabot, R. et Rossignol, A., 2003. Algues et faune du littoral du Saint-Laurent maritime. Institut des Sciences de la mer de Rimouski, Rimouski et Pêches et Océans Canada, Mont-Joli, 113 p.
- Clark, A.M. and Downey, M.E. 1992. Starfishes of the Atlantic. Chapman & Hall, London. 794 p.

- Cogswell, A.T., Kenchington, E.L.R., Lirette, C.G., MacIsaac, K., Best, M.M., Beazley, L.I., and Vickers, J. 2009. The current state of knowledge concerning the distribution of coral in the Maritime Provinces. Can. Tech. Rep. Fish. Aquat. Sci. 2855: v + 66 p.
- Dawe, E.G. and Beck, P. 1997. Population structure, growth, and sexual maturation of short-finned squid (*Illex illecebrosus*) at Newfoundland. Can. J. Zool. 54: 137-146.
- Deichmann, E. 1936. The Alcyonaria of the western part of the Atlantic Ocean. Mem. Mus. Comp. Zool. Harvard College, 53: 1-317, pl. 1-37, Cambridge, MA.
- Dutil, J.-D., Nozères, C., Scallon-Chouinard, P.-M., Van Guelpen, L., Bernier, D., Proulx, S., Miller, R., Savenkoff, C. 2009. Poissons connus et méconnus des fonds marins du Saint-Laurent. Le nat. can. 133: 70-82.
- Fontaine, P.-H. 2006. Beautés et richesses des fonds marins du Saint-Laurent. Éditions MultiMondes, Québec. 261 p.
- Gagnon, J.-M. and Gilkinson, K.D. 1994. Discrimination and distribution of the sea urchins *Strongylocentrotus droebachiensis* (O.F. Müller) and *S. pallidus* (G.O. Sars) in the Northwest Atlantic. Sarsia 79: 1-11.
- Gagnon, J.-M., Beaudin, L., Silverberg, N., and Mauviel, A. et al. 2013. Mesocosm and in situ observations of the burrowing shrimp *Calocaris templemani* (Decapoda: Thalassinidea) and its bioturbation activities in soft sediments of the Laurentian Trough. Mar. Biol. 160: 2687-2697.
- Gardiner, K. and Dick, T. 2010. Arctic cephalopod distributions and their associated predators. Polar Res. 146: 209-227.
- Grainger, E.H. 1966. Sea stars (Echinodermata: Asteroidea) of arctic North America. Bull. Fish Res. Bd. 152: vii + 70 p.
- Hansen, B. and McKenzie, J.D. 1991. A taxonomic review of Northern Atlantic species of Thyonidiinae and Semperiellinae (Echinodermata: Holothuroidea: Dendrochirotida). Zool. J. Linn. Soc. 103:101-127.
- Just, H. and Edmunds, M. 1985. North Atlantic nudibranchs (Mollusca) seen by Henning Lemche, with additional species from the Mediterranean and the Northeast Pacific. Ophelia Suppl. 2:1-170.
- Kanneworff, B. and Christensen, A.M. 1966. *Kronborgia caridicola* sp. nov., an endoparasitic turbellarian from North Atlantic shrimps. Ophelia 3: 65-80.
- Lambert, G. and Sanamyan, K. 2001. *Distaplia alaskensis* sp. nov. (Asciadiacea, Aplousobranchia) and other new ascidian records from south-central Alaska, with a redescription of *Ascidia columbiana* (Huntsman, 1912). Can. J. Zool. 79: 1766-1781.

- Lévesque, M. 2009. Caractérisation de la macrofaune épibenthique de l'estuaire et du nord du Golfe du Saint-Laurent (Québec-Canada) en relation avec les paramètres environnementaux : analyses multivariées et approche de géostatistique. Thèse de maîtrise. Université du Québec à Rimouski, Rimouski (Québec). ii + 103 p.
- Mah, C.L. and Foltz, D.W. 2014. New taxa and taxonomic revisions to the Poraniidae (Valvatacea; Asteroidea) with comments on feeding biology. *Zootaxa* 3795: 327-372.
- Mark, S., Provencher, L., Albert, E. et Nozères, C. 2010. Cadre de suivi écologique de la zone de protection marine Manicouagan (Québec): bilan des connaissances et identification des composantes écologiques à suivre. *Rapp. tech. can. sci. halieut. aquat.* 2914 : xi + 121 p.
- Martin, J.L., LeGresley, M.M., Thorpe, B., and McCurdy, P. 2011. Non-indigenous tunicates in the Bay of Fundy, eastern Canada (2006-2009). *Aquat. Invasions* 6: 405-412.
- Martinez, A.J. 2002. *Marine life of the North Atlantic*. 3rd ed. Aqua Quest, New York. 272 p.
- Mercer, M.C. 1968. Systematics and biology of the sepiolid squids of the genus *Rossia* Owen, 1935 in Canadian waters with a preliminary review of the genus. MSc. thesis, Memorial U., Nfld. 96 p.
- Mercer, M.C. 1970. Sur la limite septentrionale du calmar *Loligo pealei* Lesueur. *Le nat. can.* 97: 823-824.
- Muus, B. 2002. The *Bathypolypus-Benthoctopus* problem of the North Atlantic (Octopodidae, Cephalopoda). *Malacologia* 44: 175-222.
- Nozères, C. 2011. Managing image data in aquatic sciences: an introduction to best practices and workflows. *Can. Tech. Rep. Fish. Aquat. Sci.* 2962: xi + 171 p.
- Nozères, C. 2014. St. Lawrence marine invertebrates posters. figshare. <http://dx.doi.org/10.6084/m9.figshare.985581>
- Nozères, C. and Archambault, D. 2014. Portfolio d'affiches pour l'identification rapide d'invertébrés capturés au chalut dans l'estuaire et le nord du golfe du Saint-Laurent. *Rapp. manus. can. sci. halieut. aquat.* 3033 : iv + 30 p.
- Nozères, C. and Bérubé, M. 2003. Marine species identification guide of the St. Lawrence. Fisheries and Oceans Canada, Maurice Lamontagne Institute. 172 p. [PDF on CD-ROM].
- Nozères, C., Archambault, D., Chouinard, P.-M., Gauthier, J., Miller, R., Parent, E., Schwab, P., Savard, L., and Dutil, J.-D. 2010. Identification guide for marine fishes of the estuary and northern Gulf of St. Lawrence and sampling protocols

- used during trawl surveys between 2004 and 2008. Can. Tech. Rep. Fish. Aquat. Sci. 2866: xi + 243 p.
- Petersen, G.H. 2001. Studies on some Arctic and Baltic *Astarte* species (Bivalvia, Mollusca). Meddelelser om Grønland, Bioscience 52. 71 p.
- Pohle, G. 1988. A guide to the deep-sea shrimp and shrimp-like decapod Crustacea of Atlantic Canada. Can. Tech. Fish. Aquat. Sci. 1657: iv + 29 p.
- Pollock, L. W. 1998. A practical guide to the marine animals of northeastern North America. Rutgers University Press, New Brunswick, NJ. 367 p.
- Provencher, L. et Nozères, C. 2013. Biodiversité du secteur marin de la péninsule de Manicouagan : une aire marine protégée en devenir. Le nat. can. 137: 51-63.
- Rudman, W.B., 2007. Comment on Shell-less gastropod from Gulf of St Lawrence, Canada by Patrice Goudreau. [Message in] Sea Slug Forum. Australian Museum, Sydney. <http://www.seaslugforum.net/find/20216>.
- Savard, L. and Nozères, C. 2012. Atlas of shrimp species of the Estuary and northern Gulf of St. Lawrence. Can. Tech. Rep. Fish. Aquat. Sci. 3007: vi + 67 p.
- Schrödl, M., Wägele, H., and Willan, R.C. 2001. Taxonomic redescription of the Doridoxidae (Gastropoda: Opisthobranchia), an enigmatic family of deep water nudibranchs, with discussion of basal nudibranch phylogeny. Zool. Anz. 240: 83-97.
- Sebens, K.P. 1998. Marine Flora and Fauna of the Eastern United States. Anthozoa: Actiniaria, Zoanthidea, Corallimorpharia, and Ceriantharia. NOAA Tech. Rep. NMFS 141: 1-67.
- Shih, C.T. 1977 A guide to the jellyfish of Canadian Atlantic waters. National Museum of Natural Sciences, Natural History Series, 5: 1-90, pl. 1-14. Ottawa
- Whiteaves, I.F. 1901. Catalogue of the marine invertebrata of eastern Canada. Geol. Surv. Can. Publ. 722: 1-272.
- Williams, G.C. 2013. New taxa and revisionary systematics of alcyonacean octocorals from the Pacific coast of North America (Cnidaria, Anthozoa). ZooKeys 283: 15-42.
- Van Name, W.G. 1945. The North and South American ascidians. Bull. Am. Mus. Nat. Rist. 84 : 1-476, fig. 1-327, pl. 1-31.
- Vecchione, M. and Galbraith, J. 2001. Cephalopod species collected by deepwater exploratory fishing off New England. Fish. Res. 51: 385-391.

Table 1. List of marine taxa in the photocatalogue, in alphabetical order by taxonomic name. Source: WoRMS, <http://www.marinespecies.org>, consulted 2013-06-17.

AphiaID	Name	Authority	Phylum
158210	<i>Actinauge cristata</i>	Riemann-Zürneck, 1986	Cnidaria
100839	<i>Actinostola callosa</i>	(Verrill, 1882)	Cnidaria
118827	<i>Aega psora</i>	(Linnaeus, 1758)	Arthropoda
101820	<i>Aeginina longicornis</i>	(Kroyer, 1843)	Arthropoda
110993	<i>Alcyonidium</i> sp.	J.V.F. Lamouroux, 1813	Bryozoa
159928	<i>Amicula vestita</i>	(Broderip & G.B. Sowerby I, 1829)	Mollusca
131474	<i>Amphitrite cirrala</i>	(O.F. Müller, 1771 in 1776)	Annelida
123613	<i>Amphiura</i> sp.	Forbes, 1843	Echinodermata
137650	<i>Anomia</i> sp.	Linnaeus, 1758	Mollusca
101592	<i>Anonyx</i> sp.	Krøyer, 1838	Arthropoda
128504	<i>Anthoptilum grandiflorum</i>	(Verrill, 1879)	Cnidaria
333005	<i>Aphroditella hastata</i>	(Moore, 1905)	Annelida
106182	<i>Arcoscalpellum michelottianum</i>	(Seguenza, 1876)	Arthropoda
714762	<i>Ariadnaria borealis</i>	(Broderip & G. B. Sowerby I, 1829)	Mollusca
531617	<i>Arrhoges occidentalis</i>	(Beck, 1836)	Mollusca
103483	<i>Ascidia</i> sp.	Linnaeus, 1767	Chordata
172017	<i>Asconema foliatum</i>	(Fristedt, 1887)	Porifera
137683	<i>Astarte</i> sp.	J. de C. Sowerby, 1816	Mollusca
138818	<i>Astarte borealis</i>	(Schumacher, 1817)	Mollusca
135282	<i>Atolla wyvillei</i>	Haeckel, 1880	Cnidaria
490735	<i>Aulacofusus brevicauda</i>	(Deshayes, 1832)	Mollusca
135306	<i>Aurelia aurita</i>	(Linnaeus, 1758)	Cnidaria
130725	<i>Austrolaenilla mollis</i>	(Sars, 1872)	Annelida
131484	<i>Axionice maculata</i>	(Dalyell, 1853)	Annelida
106057	Balanidae	Leach, 1806	Arthropoda
137763	<i>Bathyarca</i> sp.	Kobelt, 1891	Mollusca
157011	<i>Bathypolypus bairdii</i>	(Verrill, 1873)	Mollusca
138855	<i>Beringius turtoni</i>	(Bean, 1834)	Mollusca
100817	<i>Bolocera tuediae</i>	(Johnston, 1832)	Cnidaria
103814	<i>Boltenia echinata</i>	(Linnaeus, 1767)	Chordata
103815	<i>Boltenia ovifera</i>	(Linnaeus, 1767)	Chordata
119842	<i>Boreomysis</i> sp.	G.O. Sars, 1869	Arthropoda
146732	<i>Boreotrophon clathratus</i>	(Linnaeus, 1767)	Mollusca
146733	<i>Boreotrophon truncatus</i>	(Strøm, 1768)	Mollusca
103528	<i>Botrylloides</i> sp.	Milne-Edwards, 1841	Chordata
130097	<i>Brada inhabilis</i>	(Rathke, 1843)	Annelida
124404	<i>Brisaster fragilis</i>	(Düben & Koren, 1844)	Echinodermata
137701	<i>Buccinum</i> sp.	Linnaeus, 1758	Mollusca
138875	<i>Buccinum scalariforme</i>	Møller, 1842	Mollusca
138878	<i>Buccinum undatum</i>	Linnaeus, 1758	Mollusca
158383	<i>Calocaris templemani</i>	Squires, 1965	Arthropoda
158057	<i>Cancer irroratus</i>	Say, 1817	Arthropoda
124020	<i>Ceramaster granularis</i>	(Retzius, 1783)	Echinodermata
107315	<i>Chionoecetes opilio</i>	(O. Fabricius, 1788)	Arthropoda
106207	<i>Chirona hameri</i>	(Ascanius, 1767)	Arthropoda
140692	<i>Chlamys islandica</i>	(O.F. Müller, 1776)	Mollusca
129525	<i>Chone</i> sp.	Krøyer, 1856	Annelida
381904	<i>Ciliatocardium ciliatum ciliatum</i>	(Fabricius, 1780)	Mollusca

AphiaID	Name	Authority	Phylum
238377	<i>Cistenides granulata</i>	(Linnaeus, 1767)	Annelida
103870	<i>Cnemidocarpa finmarkiensis</i>	(Kiaer, 1893)	Chordata
146851	<i>Colga villosa</i>	(Odhner, 1907)	Mollusca
160212	<i>Colus pubescens</i>	(A. E. Verrill, 1882)	Mollusca
160215	<i>Colus stimpsoni</i>	(Mörch, 1868)	Mollusca
156763	<i>Crenella faba</i>	(O.F. Müller, 1776)	
124154	<i>Crossaster papposus</i>	(Linnaeus, 1767)	Echinodermata
140525	<i>Cryptonatica affinis</i>	(Gmelin, 1791)	Mollusca
123915	<i>Ctenodiscus crispatus</i>	(Retzius, 1805)	Echinodermata
124612	<i>Cucumaria frondosa</i>	(Gunnerus, 1767)	Echinodermata
137858	<i>Cuspidaria</i> sp.	Nardo, 1840	Mollusca
135301	<i>Cyanea capillata</i>	(Linnaeus, 1758)	Cnidaria
156832	<i>Cyclocardia borealis</i>	(Conrad, 1832)	Mollusca
103881	<i>Dendrodoa carnea</i>	(Rathke, 1806)	Chordata
103885	<i>Dendrodoa pulchella</i>	(Rathke, 1806)	Chordata
137885	<i>Dendronotus</i> sp.	Alder & Hancock, 1845	Mollusca
103456	<i>Didemnum</i> sp.	Savigny, 1816	Chordata
124128	<i>Diplopteraster multipes</i>	(M. Sars, 1866)	Echinodermata
370549	<i>Doridoxa ingolfiana</i>	Bergh, 1899	Mollusca
146941	<i>Drifa glomerata</i>	Verrill, 1869	Cnidaria
146943	<i>Duva florida</i>	(Rathke, 1806)	Cnidaria
158062	<i>Echinarachnius parma</i>	(Lamarck, 1816)	Echinodermata
102146	<i>Epimeria loricata</i>	G.O. Sars, 1879	Arthropoda
101027	<i>Epizoanthus erdmanni</i>	(Danielssen, 1890)	Cnidaria
150642	<i>Epizoanthus incrustatus</i>	Düben & Koren, 1847	Cnidaria
103624	<i>Eudistoma vitreum</i>	(Sars, 1851)	Chordata
130060	<i>Eunice pennata</i>	(O.F. Müller, 1776)	Annelida
130745	<i>Eunoe nodosa</i>	(M. Sars, 1861)	Annelida
130081	<i>Euprosine borealis</i>	Orsted, 1843	Annelida
102199	<i>Eusirus cuspidatus</i>	Krøyer, 1845	Arthropoda
142082	Fecampiidae	Graf, 1903	Platyhelminthes
135194	<i>Flabellum alabastrum</i>	Moseley in Thomson, 1873	Cnidaria
156103	<i>Gersemia rubiformis</i>	(Ehrenberg, 1834)	Cnidaria
130118	<i>Glycera capitata</i>	Orsted, 1843	Annelida
175027	<i>Golfingia margaritacea</i>	(Sars, 1851)	Sipuncula
153097	<i>Gonatus fabricii</i>	(Lichtenstein, 1818)	Mollusca
130141	<i>Goniada norvegica</i>	Orsted, 1845	Annelida
123586	<i>Gorgonocephalus</i> sp.	Leach, 1815	Echinodermata
128509	<i>Halopteris finmarchica</i>	(Sars, 1851)	Cnidaria
103828	<i>Halocynthia pyriformis</i>	(Rathke, 1806)	Chordata
110364	<i>Hamingia arcitca</i>	Danielssen & Koren, 1881	Echinodermata
129491	<i>Harmothoe</i> sp.	Kinberg, 1856	Annelida
124223	<i>Heliometra glacialis</i>	(Owen, 1833 ex Leach MS)	Echinodermata
104054	<i>Hemithiris psittacea</i>	(Gmelin, 1790)	Brachiopoda
123276	<i>Henricia</i> sp.	Gray, 1840	Echinodermata
140103	<i>Hiatella arctica</i>	(Linnaeus, 1767)	Mollusca
124043	<i>Hippasteria phrygiana</i>	(Parelius, 1768)	Echinodermata
123083	Holothuroidea		Echinodermata
100954	<i>Hormathia nodosa</i>	(Fabricius, 1780)	Cnidaria
107322	<i>Hyas araneus</i>	(Linnaeus, 1758)	Arthropoda
107323	<i>Hyas coarctatus</i>	Leach, 1816	Arthropoda
103251	<i>Hyperia galba</i>	(Montagu, 1815)	Arthropoda

AphiaID	Name	Authority	Phylum
153087	<i>Illex illecebrosus</i>	(Lesueur, 1821)	Mollusca
133247	<i>Isodictya palmata</i>	(Ellis & Solander, 1786)	Porifera
140170	<i>Lacuna vincta</i>	(Montagu, 1803)	Mollusca
129844	<i>Laetmonice filicornis</i>	Kinberg, 1856	Annelida
123222	<i>Leptasterias</i> sp.	Verrill, 1866	Echinodermata
125154	<i>Leptasterias polaris</i>	(Müller & Troschel, 1842)	Echinodermata
123896	<i>Leptychaster arcticus</i>	(M. Sars, 1851)	Echinodermata
159903	<i>Limneria undata</i>	(T. Brown, 1839)	Mollusca
593072	<i>Liponema multicornis</i>	(Verrill, 1880)	Cnidaria
107205	<i>Lithodes maja</i>	(Linnaeus, 1758)	Arthropoda
140262	<i>Littorina littorea</i>	(Linnaeus, 1758)	Mollusca
135328	<i>Lucernaria quadricornis</i>	O.F. Müller, 1776	Cnidaria
153850	<i>Lunatia pallida</i>	(Broderip & G.B. Sowerby I, 1829)	Mollusca
141580	<i>Macoma calcarea</i>	(Gmelin, 1791)	Mollusca
102820	<i>Maera loveni</i>	(Bruzellius, 1859)	Arthropoda
130305	<i>Maldane sarsi</i>	Malmgren, 1865	Annelida
141819	<i>Margarites costalis</i>	(Gould, 1841)	Mollusca
141820	<i>Margarites groenlandicus</i>	(Gmelin, 1791)	Mollusca
110690	<i>Meganyctiphanes norvegica</i>	(M. Sars, 1857)	Arthropoda
141983	<i>Megayoldia thraciaeformis</i>	(Storer, 1838)	Mollusca
129804	<i>Melinna cristata</i>	(M. Sars, 1851)	Annelida
102837	<i>Melita dentata</i>	(Kroyer, 1842)	Arthropoda
156804	<i>Mesodesma</i> sp.	Deshayes, 1831	Mollusca
124802	<i>Molpadia oolitica</i>	(Pourtalès, 1851)	Echinodermata
107175	<i>Munidopsis curvirostra</i>	Whiteaves, 1874	Arthropoda
138225	<i>Musculus</i> sp.	Röding, 1798	Mollusca
140431	<i>Mya truncata</i>	Linnaeus, 1758	Mollusca
119886	<i>Mysis</i> sp.	Latreille, 1802	Arthropoda
138228	<i>Mytilus</i> sp.	Linnaeus, 1758	Mollusca
152391	Nemertea		Nemertea
102108	<i>Neohela monstrosa</i>	(Boeck, 1861)	Arthropoda
131069	<i>Neoleanira tetragona</i>	(Ørsted, 1845)	Annelida
129370	<i>Nephtys</i> sp.	Cuvier, 1817	Annelida
491164	<i>Neptunea decemcostata</i>	(Say, 1826)	Mollusca
138923	<i>Neptunea despecta</i>	(Linnaeus, 1758)	Mollusca
130404	<i>Nereis pelagica</i>	Linnaeus, 1758	Annelida
178261	<i>Novodinia americana</i>	(Verrill, 1880)	Echinodermata
138259	<i>Nuculana</i> sp.	Link, 1807	Mollusca
134591	<i>Nymphon</i> sp.	Fabricius, 1794	Arthropoda
102908	<i>Oedicerus saginatus</i>	Krøyer, 1842	Arthropoda
138628	<i>Onchidiopsis</i> sp.	Bergh, 1853	Mollusca
152306	<i>Onuphis quadricuspis</i>	M. Sars, 1872	Annelida
124978	<i>Ophiacantha bidentata</i>	(Bruzellius, 1805)	Echinodermata
124860	<i>Ophiocten sericeum</i>	(Forbes, 1852)	Echinodermata
125125	<i>Ophiopholis aculeata</i>	(Linnaeus, 1767)	Echinodermata
125126	<i>Ophiopus arcticus</i>	Ljungman, 1867	Echinodermata
125147	<i>Ophioscolex glacialis</i>	Müller & Troschel, 1842	Echinodermata
124933	<i>Ophiura robusta</i>	(Ayres, 1854)	Echinodermata
124934	<i>Ophiura sarsii</i>	Lütken, 1855	Echinodermata
106854	<i>Pagurus</i> sp.	Fabricius, 1775	Arthropoda
140105	<i>Panomya norvegica</i>	(Spengler, 1793)	Mollusca
102152	<i>Paramphithoe hystrix</i>	(Ross, 1835)	Arthropoda

AphiaID	Name	Authority	Phylum
102945	<i>Pardalisca abyssii</i>	Boeck, 1871	Arthropoda
103894	<i>Pelonaia corrugata</i>	Goodsir & Forbes, 1841	Chordata
128515	<i>Pennatula aculeata</i>	Danielssen, 1860	Cnidaria
128516	<i>Pennatula grandis</i>	Ehrenberg, 1834	Cnidaria
124655	<i>Pentamera calcigera</i>	(Stimpson, 1851)	Echinodermata
135294	<i>Periphylla periphylla</i>	(Péron & Lesueur, 1810)	Cnidaria
131779	<i>Phakellia</i> sp.	Bowerbank, 1862	Porifera
410749	<i>Phascolion strombus strombus</i>	(Montagu, 1804)	Sipuncula
334506	<i>Phyllodoce groenlandica</i>	Ørsted, 1842	Annelida
106386	<i>Pleurobrachia pileus</i>	(O.F. Müller, 1776)	Ctenophora
491269	<i>Plicifusus kroeyeri</i>	(Möller, 1842)	Mollusca
132046	<i>Polymastia</i> sp.	Bowerbank, 1864	Porifera
103902	<i>Polycarpa fibrosa</i>	(Stimpson, 1852)	Chordata
130977	<i>Polyphysia crassa</i>	(Ørsted, 1843)	Annelida
123321	<i>Poraniomorpha</i> sp.	Danielssen & Koren, 1881	Echinodermata
101160	<i>Priapulus caudatus</i>	Lamarck, 1816	Cephalorhyncha
124085	<i>Pseudarchaster parelii</i>	(Düben & Koren, 1846)	Echinodermata
157605	<i>Pseudobonellia iraidii</i>	Murina, 1984	Echinodermata
123908	<i>Psilaster andromeda</i>	(Müller & Troschel, 1842)	Echinodermata
124703	<i>Psolus fabricii</i>	(Düben & Koren, 1846)	Echinodermata
124710	<i>Psolus phantapus</i>	(Strussenfelt, 1765)	Echinodermata
124147	<i>Pteraster militaris</i>	(O.F. Müller, 1776)	Echinodermata
124149	<i>Pteraster obscurus</i>	(Perrier, 1891)	Echinodermata
124151	<i>Pteraster pulvillus</i>	(M. Sars, 1861)	Echinodermata
117728	<i>Ptychogena lactea</i>	Agassiz, 1865	Cnidaria
239867	<i>Pycnogonum litorale</i>	(Strom, 1762)	Arthropoda
170674	<i>Radiella hemisphaerica</i>	(Sars, 1872)	Porifera
111453	<i>Reteporella grimaldii</i>	(Jullien, 1903)	Bryozoa
102224	<i>Rhachotropis aculeata</i>	(Lepechin, 1780)	Arthropoda
138481	<i>Rossia</i> sp.	Owen, 1834	Mollusca
147146	<i>Scabrotrophon fabricii</i>	(Möller, 1842)	Mollusca
130980	<i>Scalibregma inflatum</i>	Rathke, 1843	Annelida
139490	<i>Scaphander punctostriatus</i>	(Mighels & Adams, 1842)	Mollusca
111374	<i>Securiflustra securifrons</i>	(Pallas, 1766)	Bryozoa
582749	<i>Serripes groenlandicus</i>	(Mohr, 1786)	Mollusca
181299	<i>Similipecten greenlandicus</i>	(G.B. Sowerby II, 1842)	Mollusca
138597	<i>Solariella</i> sp.	S. Wood, 1842	Mollusca
124160	<i>Solaster endeca</i>	(Linnaeus, 1771)	Echinodermata
594013	<i>Staurostoma mertensii</i>	(Brandt, 1834)	Cnidaria
153122	<i>Stauroteuthis syrtensis</i>	Verrill, 1879	Mollusca
103105	<i>Stegocephalus inflatus</i>	Krøyer, 1842	Arthropoda
124943	<i>Stegophiura nodosa</i>	(Lütken, 1855)	Echinodermata
247773	<i>Stenosemus albus</i>	(Linnaeus, 1767)	Mollusca
386014	<i>Stenosemus exaratus</i>	(G.O. Sars, 1878)	Mollusca
123808	<i>Stephanasterias albula</i>	(Stimpson, 1853)	Echinodermata
158258	<i>Stephanauge nexilis</i>	(Verrill, 1883)	Cnidaria
100854	<i>Stomphia coccinea</i>	(Müller, 1776)	Cnidaria
123390	<i>Strongylocentrotus</i> sp.	Brandt, 1835	Echinodermata
103937	<i>Styela rustica</i>	Linnaeus, 1767	Chordata
134240	<i>Stylocordyla borealis</i>	(Loven, 1868)	Porifera
134285	<i>Suberites ficus</i>	(Johnston, 1842)	Porifera
131723	<i>Sycon</i> sp.	Risso, 1827	Porifera

AphiaID	Name	Authority	Phylum
103692	<i>Synoicum pulmonaria</i>	(Ellis & Solander, 1786)	Chordata
156446	<i>Syscenus infelix</i>	Harger, 1880	Arthropoda
196391	<i>Tachyrhynchus erosus</i>	(Couthouy, 1838)	Mollusca
134224	<i>Tentorium semisuberites</i>	(Schmidt, 1870)	Porifera
131573	<i>Terebellides stroemii</i>	Sars, 1835	Annelida
104056	<i>Terebratulina septentrionalis</i>	(Couthouy, 1838)	Brachiopoda
141607	<i>Teredo navalis</i>	Linnaeus, 1758	Mollusca
156451	<i>Themisto compressa</i>	Goës, 1865	Arthropoda
156452	<i>Themisto libellula</i>	Lichtenstein, 1822	Arthropoda
134106	<i>Thenea muricata</i>	(Bowerbank, 1858)	Porifera
117940	<i>Thuiaria thuja</i>	(Linnaeus, 1758)	Cnidaria
110679	<i>Thysanoessa</i> sp.	Brandt, 1851	Arthropoda
138090	<i>Tonicella</i> sp.	Carpenter, 1873	Mollusca
124002	<i>Tremaster mirabilis</i>	Verrill, 1880	Echinodermata
123815	<i>Urasterias lincki</i>	(Müller & Troschel, 1842)	Echinodermata
100834	<i>Urticina felina</i>	(Linnaeus, 1761)	Cnidaria
141905	<i>Velutina velutina</i>	(O.F. Müller, 1776)	Mollusca
138938	<i>Volutopsis norwegicus</i>	(Gmelin, 1791)	Mollusca
535546	<i>Wimvadocus forelli</i>	(Goes, 1866)	Arthropoda
138672	<i>Yoldia</i> sp.	Möller, 1842	Mollusca

Table 2. Taxa identified in photos at genus or higher taxonomic levels.

Phylum	Class	Name presented	Probable species
Arthropoda	Malacostraca	<i>Anonyx</i> sp.	<i>A. nugax</i> , <i>A. sarsi</i>
Arthropoda	Malacostraca	Balanidae	<i>B. balanus</i> , <i>B. crenatus</i>
Arthropoda	Malacostraca	<i>Boreomysis</i> sp.	<i>B. arctica</i> , <i>B. tridens</i>
Arthropoda	Malacostraca	<i>Pagurus</i> sp.	<i>P. arcuatus</i> , <i>P. pubescens</i>
Bryozoa	Gymnolaemata	<i>Alcyonidium</i> sp.	<i>A. diaphanum</i>
Chordata	Ascidiacea	<i>Ascidia</i> sp.	<i>A. callosa</i> , <i>A. obliqua</i> , <i>A. prunum</i>
Chordata	Ascidiacea	<i>Botrylloides</i> sp.	<i>B. aureum</i> , <i>B. violaceus</i>
Chordata	Ascidiacea	<i>Didemnum</i> sp.	<i>D. albidum</i> , <i>D. vexillum</i>
Cnidaria	Anthozoa	Nephtheidae	<i>Drifa glomerata</i> , <i>Duva florida</i>
Echinodermata	Asteroidea	<i>Leptasterias</i> sp.	<i>L. groenlandica</i> , <i>L. littoralis</i> , <i>L. tenera</i>
Echinodermata	Asteroidea	<i>Poraniomorpha</i> sp.	<i>P. bidens</i> , <i>P. hispida</i> , <i>P. tumida</i>
Echinodermata	Echinoidea	<i>Strongylocentrotus</i> sp.	<i>S. droebachiensis</i> , <i>S. pallidus</i>
Echinodermata	Ophiuroidea	<i>Amphiura</i> sp.	<i>A. sundevalli</i>
Echinodermata	Ophiuroidea	<i>Gorgonocephalus</i> sp.	<i>G. arcticus</i> , <i>G. eucnemis</i>
Mollusca	Bivalvia	<i>Anomia</i> sp.	<i>A. squamata</i>
Mollusca	Bivalvia	<i>Astarte</i> sp.	<i>A. castanea</i> , <i>A. crenata</i> , <i>A.</i> <i>elliptica</i> , <i>A. montagui</i> , <i>A.</i> <i>subaequilatera</i> , <i>A. undata</i>
Mollusca	Bivalvia	<i>Batharca</i> sp.	<i>B. glacialis</i> , <i>B. pectunculoides</i>
Mollusca	Bivalvia	<i>Cuspidaria</i> sp.	<i>C. glacialis</i>
Mollusca	Bivalvia	<i>Mesodesma</i> sp.	<i>M. arctatum</i>
Mollusca	Bivalvia	<i>Musculus</i> sp.	<i>M. discors</i> , <i>M. niger</i>
Mollusca	Bivalvia	<i>Mytilus</i> sp.	<i>M. edulis</i> , <i>M. trossulus</i>
Mollusca	Bivalvia	<i>Nuculana</i> sp.	<i>N. pernula</i>
Mollusca	Cephalopoda	<i>Rossia</i> sp.	<i>R. megaptera</i> , <i>R. palpebrosa</i>
Mollusca	Gastropoda	<i>Boreotrophon</i> sp.	<i>B. clathratus</i> , <i>B. truncatus</i> , <i>Scabrotrophon fabricii</i>
Mollusca	Gastropoda	<i>Colus</i> sp.	<i>C. pubescens</i> , <i>C. stimpsoni</i>
Mollusca	Gastropoda	<i>Margarites</i> sp.	<i>M. costalis</i> , <i>M. groenlandicus</i>
Mollusca	Gastropoda	<i>Neptunea</i> sp.	<i>N. decemcostata</i> , <i>N. despecta</i>
Mollusca	Gastropoda	<i>Solariella</i> sp.	<i>S. obscura</i> , <i>S. varicosa</i>
Mollusca	Gastropoda	<i>Dendronotus</i> sp.	<i>D. dalli</i> , <i>D. frondosus</i>
Mollusca	Polyplacophora	<i>Tonicella</i> sp.	<i>T. marmorea</i> , <i>T. rubra</i>
Platyhelminthes	Turbellaria	Fecampiidae	<i>Kronborgia cardicola</i>

Table 3. Historically misidentified taxa from survey catches.

Original taxa	Note	Type of error	Corrected identification
<i>Caberea ellisii</i>	bryozoan	misidentified	<i>Securiflustra securifrons</i>
<i>Metridium senile</i>	sea anemone	misidentified (coastal)	<i>Actinostola callosa</i>
<i>Anthomastus grandiflorus</i>	coral	absent	<i>Gersemia rubiformis</i>
<i>Paramuricea</i> sp.	coral	absent	<i>Heliometra glacialis</i>
<i>Asterias</i> sp.	sea star	misidentified (coastal)	<i>Leptasterias polaris</i> , <i>Urasterias lincki</i>
<i>Echinocardium cordatum</i>	urchin	absent (southern)	<i>Brisaster fragilis</i>
<i>Placopecten magellanicus</i>	bivalve	misidentified (coastal)	<i>Similpecten greenlandicus</i>
<i>Bathypolypus arcticus</i>	cephalopod	absent (northern)	<i>Bathypolypus bairdii</i>
<i>Loligo pealeii</i>	cephalopod	absent (southern)	<i>Illex illecebrosus</i>
<i>Semirossia tenera</i>	cephalopod	absent (southern)	<i>Rossia</i> spp. (<i>R. megaptera</i> , <i>R. palpebrosa</i>)
<i>Calliostoma occidentale</i>	gastropod	absent (southern)	<i>Margarites costalis</i>
<i>Colus</i> sp.	gastropod	misidentified	<i>Beringius turtoni</i>
<i>Haminoe solitaria</i>	gastropod	misidentified	<i>Scaphander punctostriatus</i>
<i>Euspira heros</i>	gastropod	misidentified (coastal)	<i>Cryptonatica affinis</i> , <i>Lunatia pallida</i>
<i>Cadlina laevis</i>	nudibranch gastropod	misidentified (coastal)	<i>Doridoxa ingolfiana</i>
<i>Palio dubia</i>	nudibranch gastropod	misidentified (coastal)	<i>Colga villosa</i>
<i>Weyprechtia pinguis</i>	amphipod	misidentified	<i>Pardalisca abyssi</i>
<i>Idotea</i> sp.	isopod	misidentified (coastal)	<i>Syscenus infelix</i>
<i>Lepas</i> sp.	gooseneck barnacle	misidentified	<i>Arcoscalpellum michelottianum</i>

Table 4. Taxa of pelagic or planktonic origin captured by the bottom trawl.

Taxon	Note
<hr/> macroinvertebrate (size >5 cm) <hr/>	
<i>Illex illecebrosus</i>	pelagic cephalopod
<i>Stauroteuthis syrtensis</i>	pelagic cephalopod
<i>Atolla wyvillei</i>	scyphozoan jelly
<i>Aurelia aurita</i>	scyphozoan jelly
<i>Cyanea capillata</i>	scyphozoan jelly
<i>Periphylla periphylla</i>	scyphozoan jelly
<i>Ptychogena lactea</i>	hydrozoan jelly
<i>Staurostoma mertensii</i>	hydrozoan jelly
<hr/> zooplankton (size approx. 2-5 cm) <hr/>	
<i>Pleurobrachia pileus</i>	pelagic comb jelly
<i>Boreomysis</i> sp.	bathyal mysid
<i>Mysis</i> sp.	inshore mysid
<i>Meganyctiphanes norvegica</i>	pelagic euphausiid
<i>Thysanoessa</i> sp.	pelagic euphausiid
<i>Eusirus cuspidatus</i>	suprabenthic amphipod
<i>Rhachotropis aculeata</i>	suprabenthic amphipod
<i>Hyperia galba</i>	pelagic amphipod
<i>Themisto compressa</i>	pelagic amphipod
<i>Themisto libellula</i>	pelagic amphipod

Table 5. Principal synonyms and common names of taxa.

Taxonomic name	Synonym	English name	French name
<i>Actinauge cristata</i>	<i>Actinauge verrilli</i>	reticulate anemone	
<i>Actinostola callosa</i>			
<i>Aega psora</i>			
<i>Aeginina longicornis</i>			
<i>Alcyonidium</i> sp.			
<i>Amicula vestita</i>		concealed arctic chiton	chiton vêtu
<i>Amphitrite cirrata</i>			
<i>Amphiura</i> sp.			
<i>Anomia</i> sp.		jingle shell	anomie
<i>Anonyx</i> sp.			
<i>Anthoptilum grandiflorum</i>			
<i>Aphroditella hastata</i>	<i>Aphrodita hastata</i>	sea mouse	souris de mer
<i>Arcoscalpellum michelottianum</i>	<i>Scalpellum michelottianum</i>		
<i>Ariadnaria borealis</i>	<i>Trichotropis borealis</i>	boreal hairy shell	
<i>Arrhoges occidentalis</i>	<i>Aporrhais occidentalis</i>	American pelicanfoot sea squirt	pied de pélican ascidie
<i>Ascidia</i> sp.			
<i>Asconema foliatum</i>	<i>Trichasterina bispiculigastra</i>		
<i>Astarte</i> sp.			
<i>Astarte borealis</i>		boreal astarte	
<i>Atolla wyvillei</i>		Wyville's crownjelly	
<i>Aulacofusus brevicauda</i>	<i>Colus spitzbergensis, Neptunea brevicauda</i>		
<i>Aurelia aurita</i>		moon jelly	méduse de lune
<i>Austrolaenilla mollis</i>	<i>Antinoella mollis, Harmothoe mollis</i>		
<i>Axionice maculata</i>			
Balanidae		barnacles	balanes
<i>Bathyarca</i> sp.			
<i>Bathypolypus bairdii</i>	<i>Octopus bairdii</i>	spoonarm octopus	
<i>Beringius turtoni</i>	<i>Fusus turtoni</i>		
<i>Bolocera tuediae</i>		deeplet sea anemone	
<i>Boltenia echinata</i>		cactus sea squirt	
<i>Boltenia ovifera</i>		sea potato	patate de mer
<i>Boreomysis</i> sp.			
<i>Boreotrophon clathratus</i>	<i>Trophon clathratus, Murex clathratus</i>	clathrate trophon	
<i>Boreotrophon truncatus</i>	<i>Trophon truncatus</i>	bobtail trophon	
<i>Botrylloides</i> sp.			

Taxonomic name	Synonym	English name	French name
<i>Brada inabilis</i>			
<i>Brisaster fragilis</i>	<i>Schizaster fragilis</i>	heart urchin	oursin de coeur
<i>Buccinum</i> sp.		whelk	buccin
<i>Buccinum scalariforme</i>	<i>Buccinum tenue</i>	ladder whelk	
<i>Buccinum undatum</i>		waved whelk	buccin commun
<i>Calocaris templemani</i>		burrowing mud shrimp	crevette fouisseuse
<i>Cancer irroratus</i>		Atlantic rock crab	crabe commun
<i>Ceramaster granularis</i>		cookie star	étoile biscuit
<i>Chionoecetes opilio</i>		snow crab	crabe des neiges
<i>Chirona hameri</i>	<i>Balanus hameri</i>		
<i>Chlamys islandica</i>	<i>Pecten islandica</i>	Iceland scallop	pétoncle d'Islande
<i>Chone</i> sp.			
<i>Ciliatocardium ciliatum</i>	<i>Clinocardium ciliatum</i>	hairy cockle	coque d'Islande
<i>Cistenides granulata</i>	<i>Pectinaria granulata</i>	ice cream cone worm	ver en cornet, ver trompette
<i>Cnemidocarpa finmarkiensis</i>	<i>Polycarpa finmarkiensis</i>		
<i>Colga villosa</i>	<i>Issa lacera</i>		
<i>Colus pubescens</i>		hairy colus	colus poilu
<i>Colus stimpsoni</i>		Stimpson's colus	colus de Stimpson
<i>Crenella faba</i>			
<i>Crossaster papposus</i>	<i>Solaster papposus</i>	spiny sun star	soleil de mer épineux
<i>Cryptonatica affinis</i>	<i>Natica clausa</i>	Arctic moonsnail	natice close
<i>Ctenodiscus crispatus</i>		mud star	étoile de vase
<i>Cucumaria frondosa</i>		orange-footed sea cucumber	concombre de mer du Nord
<i>Cuspidaria</i> sp.		dipperclam	cuspidarie
<i>Cyanea capillata</i>		lion's mane jellyfish	crinière de lion
<i>Cyclocardia borealis</i>	<i>Cardita borealis</i> , <i>Venericardia borealis</i>	northern cardita	cyclocardia nordique
<i>Dendrodoa carnea</i>		blood drop tunicate	ascidie goutte de sang
<i>Dendrodoa pulchella</i>			
<i>Dendronotus</i> sp.			
<i>Didemnum</i> sp.			
<i>Diplopteraster multipes</i>	<i>Pteraster multipes</i>		
<i>Doridoxa ingolfiana</i>			
<i>Drifa glomerata</i>		sea cauliflower	chou-fleur de mer
<i>Duva florida</i>	<i>Capnella florida</i> , <i>Eunephyta florida</i>	sea broccoli	brocoli de mer
<i>Echinarachnius parma</i>		sand dollar	dollar de sable
<i>Epimeria loricata</i>			
<i>Epizoanthus erdmanni</i>			

Taxonomic name	Synonym	English name	French name
<i>Epizoanthus incrustatus</i>			
<i>Eudistoma vitreum</i>	<i>Polycitor vitreus</i>		
<i>Eunice pennata</i>	<i>Nereis pennata</i>		
<i>Eunoe nodosa</i>	<i>Harmothoe nodosa</i> , <i>Polynoe nodosa</i>		
<i>Euphrosine borealis</i>			
<i>Eusirus cuspidatus</i>			
Fecampiidae			
<i>Flabellum alabastrum</i>		cup coral	corail de coupe
<i>Gersemia rubiformis</i>	<i>Eunephyta rubiformis</i>	sea strawberry	framboise de mer
<i>Glycera capitata</i>	<i>Glycera nana</i>		
<i>Golfingia margaritacea</i>			
<i>Gonatus fabricii</i>		boreoatlantic armhook squid	encornet atlantoboréal
<i>Goniada norvegica</i>			
<i>Gorgonocephalus</i> sp.		basket star	gorgonocéphale
<i>Halipterus finmarchica</i>			
<i>Halocynthia pyriformis</i>		sea peach	pêche de mer
<i>Hamingia arctica</i>			
<i>Harmothoe</i> sp.		scaled worm	ver à écailles
<i>Heliogetra glacialis</i>	<i>Antedon glacialis</i>		
<i>Hemithiris psittacea</i>		parrot-beak lamp shell	rhynchonella grise
<i>Henricia</i> sp.		blood star	
<i>Hiatella arctica</i>		Arctic saxicave, rock borer	saxicave arctique
<i>Hippasteria phrygiana</i>		horse star, rigid cushion star	étoile coussin
Holothuroidea		sea cucumber	concombre de mer
<i>Hormathia nodosa</i>	<i>Hormathia tuberculosa</i>	rugose anemone	anémone noduleuse
<i>Hyas araneus</i>		toad crab	crabe araignée
<i>Hyas coarctatus</i>		violin crab	crabe violon
<i>Hyperia galba</i>		big-eye amphipod	amphipode à grand-œil
<i>Illex illecebrosus</i>		northern shortfin squid	encornet rouge nordique
<i>Isodictya palmata</i>	<i>Halichondria palmata</i>	palmate sponge	éponge palmée
<i>Lacuna vineta</i>	<i>Ephera vineta</i>	northern lacuna	lacune commune de l'atlantique
<i>Laetmonice filicornis</i>			
<i>Leptasterias</i> sp.			
<i>Leptasterias polaris</i>	<i>Asterias borealis</i>	polar sea star	étoile de mer polaire
<i>Leptychaster arcticus</i>		Arctic sand star	
<i>Limneria undata</i>	<i>Velutina velutina</i>	undate velutina	veloutée rayée
<i>Liponema multicornis</i>	<i>Bolocera multicornis</i> , <i>Liponema multicornis</i>		

Taxonomic name	Synonym	English name	French name
<i>Lithodes maja</i>		northern stone crab	crabe épineux
<i>Littorina littorea</i>		common periwinkle	littorine commune
<i>Lucernaria quadricornis</i>		horned stalked jellyfish	lucernaire à quatre cornes
<i>Lunatia pallida</i>	<i>Euspira pallida</i> , <i>Natica pallida</i> , <i>Natica groenlandica</i>	pale moonsnail	natice pâle
<i>Macoma calcarea</i>		chalky macoma	macome calcaire
<i>Maera loveni</i>			
<i>Maldane sarsi</i>		bamboo worm	ver bambou
<i>Margarites costalis</i>		boreal rosy margarite	troque rose boréal
<i>Margarites groenlandicus</i>	<i>Margarites umbilicalis</i>	Greenland margarite	troque du Groenland
<i>Meganyctiphanes norvegica</i>		horned krill, northern krill	
<i>Megayoldia thraciaeformis</i>	<i>Yoldia thraciaeformis</i>	broad yoldia	
<i>Melinna cristata</i>	<i>Sabellides cristata</i>		
<i>Melita dentata</i>			
<i>Mesodesma</i> sp.		wedgeclam	clovisse
<i>Molpadia oolitica</i>			
<i>Munidopsis curvirostra</i>		squat lobster, galatheid crab	
<i>Musculus</i> sp.		mussel	moule
<i>Mya truncata</i>		truncate clam, truncate softshell	mye tronqué
<i>Mysis</i> sp.			
<i>Mytilus</i> sp.		mussel	moules
<i>Nemertea</i>		ribbon worms	
<i>Neohela monstrosa</i>			
<i>Neoleanira tetragona</i>	<i>Leanira tetragona</i>		
<i>Nephtys</i> sp.			
<i>Neptunea decemcostata</i>	<i>Neptunea lyrata decemcostata</i>	wrinkled neptune, wrinkled whelk	neptunée à dix côtes
<i>Neptunea despecta</i>		rejected neptune	neptunée commune du Nord
<i>Nereis pelagica</i>			
<i>Novodinia americana</i>	<i>Brisinga americana</i>		
<i>Nuculana</i> sp.		nutclam	
<i>Nymphon</i> sp.		sea spider	araignée de mer
<i>Oedicerus saginatus</i>			
<i>Onchidiopsis</i>			
<i>Onuphis quadricuspis</i>	<i>Sarsonuphis quadricuspis</i>		
<i>Ophiacantha bidentata</i>		spiny brittlestar	ophiure épineuse
<i>Ophiocten sericeum</i>			

Taxonomic name	Synonym	English name	French name
<i>Ophiopholis aculeata</i>		daisy brittlestar	ophiure pâquerette
<i>Ophiopus arcticus</i>			
<i>Ophioscolex glacialis</i>			
<i>Ophiura robusta</i>			
<i>Ophiura sarsii</i>			
<i>Pagurus</i> sp.		hermit crab	bernard-l'hermite
<i>Panomya norvegica</i>	<i>Mya norvegica</i> , <i>Panyomya arctica</i>	Arctic roughmya	
<i>Paramphithoe hystrix</i>	<i>Acanthozone</i> <i>cuspidata</i>		hérisson des éponges
<i>Pardalisca abyssi</i>	<i>Pardalisca cuspidata</i>		
<i>Pelonaia corrugata</i>		sandfinger	
<i>Pennatula aculeata</i>			
<i>Pennatula grandis</i>	<i>Pennatula borealis</i>		
<i>Pentamera calcigera</i>			
<i>Periphylla periphylla</i>		merchant-cap	bonnet-marchand
<i>Phakellia</i> sp.			
<i>Phascolion strombus</i> <i>strombus</i>			
<i>Phyllodoce groenlandica</i>	<i>Anaitides</i> <i>groenlandica</i>	Greenland paddleworm	
<i>Pleurobrachia pileus</i>		sea gooseberry	groseille de mer ronde
<i>Plicifusus kroeyeri</i>	<i>Colus kroeyeri</i> , <i>Fusus</i> <i>kroeyeri</i> , <i>Sipho plicatus</i>		
<i>Polycarpa fibrosa</i>			
<i>Polymastia</i> sp.	<i>Spongia</i>	nipple sponge	éponge mamelle
<i>Polyphysia crassa</i>			
<i>Poraniomorpha</i> sp.			
<i>Priapulus caudatus</i>		catus worm	
<i>Pseudarchaster parelii</i>		northern scarlet star	
<i>Pseudobonellia iraidii</i>			
<i>Psilaster andromeda</i>		Andromeda star	
<i>Psolus fabricii</i>		scarlet psolus	psolus écarlate
<i>Psolus phantapus</i>		brown psolus	psolus brun
<i>Pteraster militaris</i>		winged sea star	
<i>Pteraster obscurus</i>		obscure cushion star	
<i>Pteraster pulvillus</i>		pentagonal cushion star	
<i>Ptychogena lactea</i>			
<i>Pycnogonum litorale</i>		anemone sea spider	araignée d'anémone
<i>Radiella hemisphaerica</i>	<i>Polymastia</i> <i>hemisphaerica</i>		
<i>Reteporella grimaldii</i>	<i>Sertella</i> <i>septentrionalis</i>	Neptune's lace	dentelle de Vénus

Taxonomic name	Synonym	English name	French name
<i>Rhachotropis aculeata</i>			
<i>Rossia</i> sp.		bobtail squid	sépiole calamarette
<i>Scabrotrophon fabricii</i>	<i>Boreotrophon fabricii</i> , <i>Trophon craticulatus</i>		
<i>Scalibregma inflatum</i>			
<i>Scaphander punctostriatus</i>	<i>Bulla punctostriata</i>	giant canoe-bubble	
<i>Securiflustra securifrons</i>	<i>Flustra securifrons</i>		
<i>Serripes groenlandicus</i>		Greenland smooth cockle	coque du Groenland
<i>Similipecten greenlandicus</i>	<i>Cyclopecten</i> , <i>Delectopecten</i>	Greenland scallop	
<i>Solariella</i> sp.	<i>Trochus</i>		
<i>Solaster endeca</i>		purple sun star	soleil de mer pourpre
<i>Staurostoma mertensii</i>	<i>Staurophora mertensii</i>	whitecross jellyfish	méduse à croix blanche
<i>Stauroteuthis syrtensis</i>		glowing sucker octopod	
<i>Stegocephalus inflatus</i>			
<i>Stenosemus albus</i>	<i>Ischnochiton albus</i>		
<i>Stenosemus exaratus</i>	<i>Ischnochiton exaratus</i>		
<i>Stephanasterias albula</i>			
<i>Stephanauge nexilis</i>			
<i>Stomphia coccinea</i>		swimming anemone	anémone marbrée
<i>Strongylocentrotus</i> sp.		sea urchin	oursin de mer
<i>Styela rustica</i>		stalked sea squirt	
<i>Stylocordyla borealis</i>			
<i>Suberites ficus</i>		fig sponge	
<i>Sycon</i> sp.			
<i>Synoicum pulmonaria</i>	<i>Amaroucium</i> , <i>Aplidium</i>		
<i>Syscenus infelix</i>			
<i>Tachyrhynchus erosus</i>		eroded turretsnail	
<i>Tentorium semisuberites</i>			
<i>Terebellides stroemii</i>			
<i>Terebratulina septentrionalis</i>		northern lamp shell	térébratule du nord
<i>Teredo navalis</i>		common shipworm	taret commun
<i>Themisto compressa</i>	<i>Parathemisto compressa</i>		
<i>Themisto libellula</i>	<i>Parathemisto libellula</i>		
<i>Thenea muricata</i>			
<i>Thuiaria thuja</i>		bottlebrush hydroid	
<i>Thysanoessa</i>			
<i>Tonicella</i> sp.			
<i>Tremaster mirabilis</i>			

Taxonomic name	Synonym	English name	French name
<i>Urasterias lincki</i>	<i>Asterias lincki</i> , <i>Urasterias enopla</i>		
<i>Urticina felina</i>	<i>Tealia felina</i>	northern red anemone	dahlia de mer
<i>Velutina velutina</i>	<i>Velutina laevigata</i>	smooth velutina	veloutée lisse
<i>Volutopsius norvegicus</i>	<i>Volutopsis norvegicus</i>	Norwegian volute whelk	
<i>Wimvadocus torelli</i>	<i>Ceradocus torelli</i>		
<i>Yoldia</i> sp.			

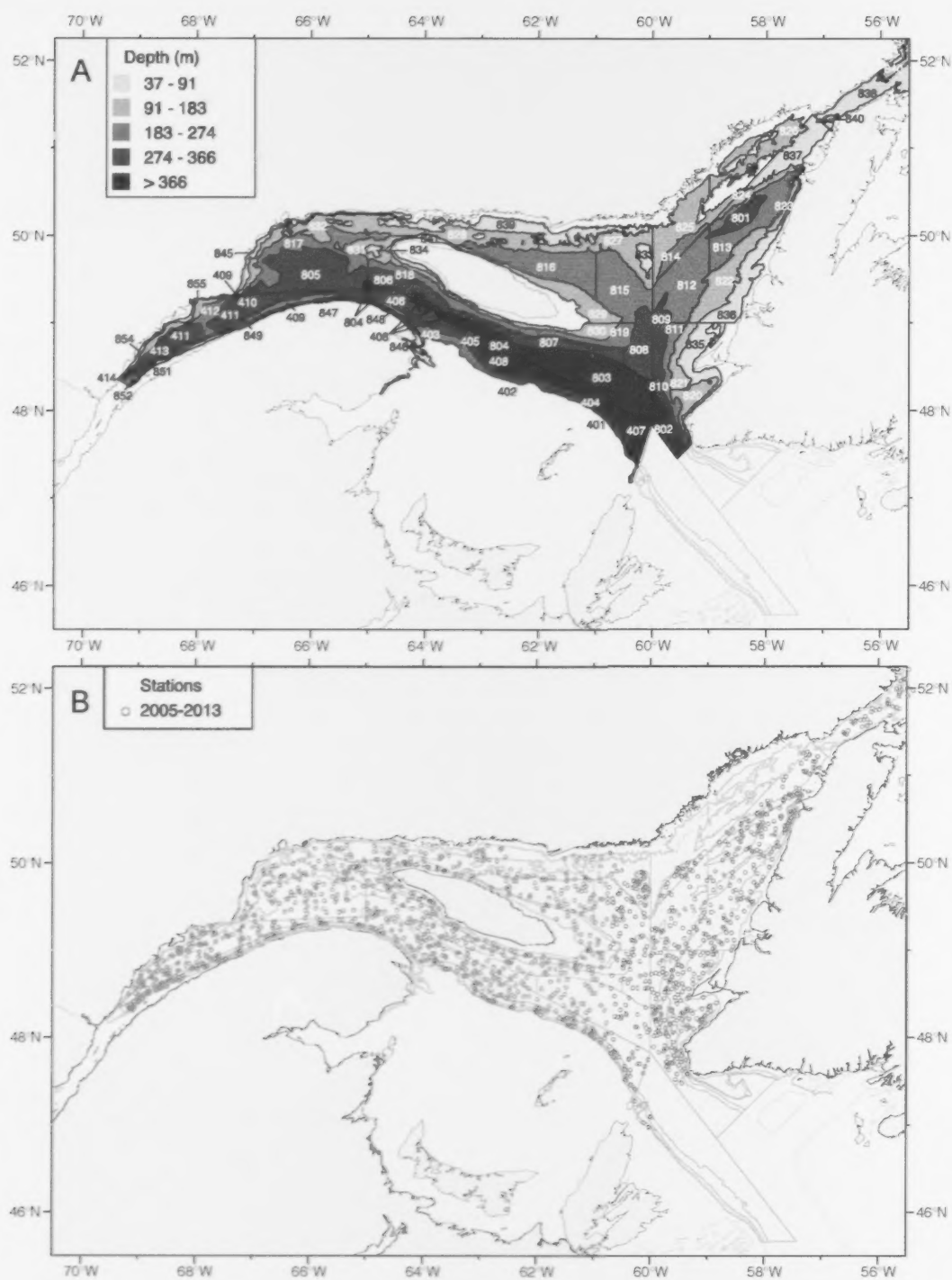


Figure 1. Estuary and Northern Gulf of St. Lawrence bottom trawl survey area. (A) Depth intervals, in fathoms converted to metres. (B) Stations with catches of invertebrates in 2005-2013.

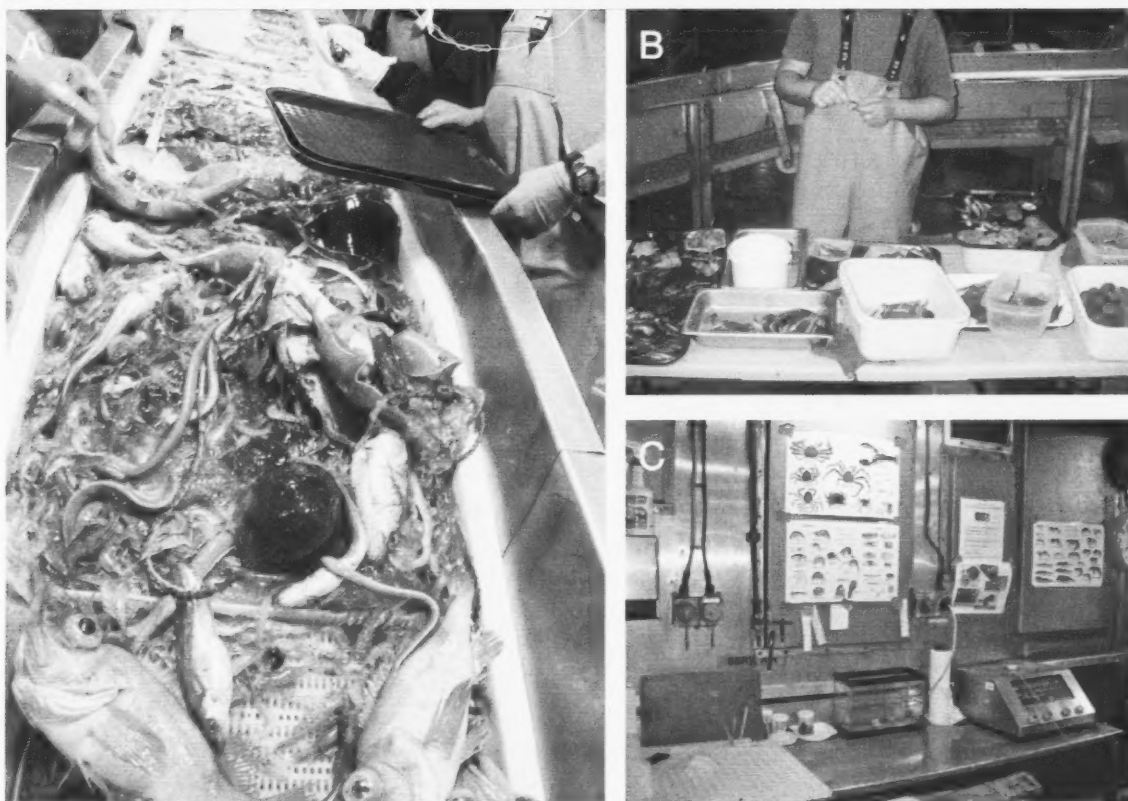


Figure 2. Workflow carried out at-sea: (A) sorting of the trawl catch on the conveyor belt; (B) grouping of specimens by type; (C) identification, counting, and weighing of each taxa.

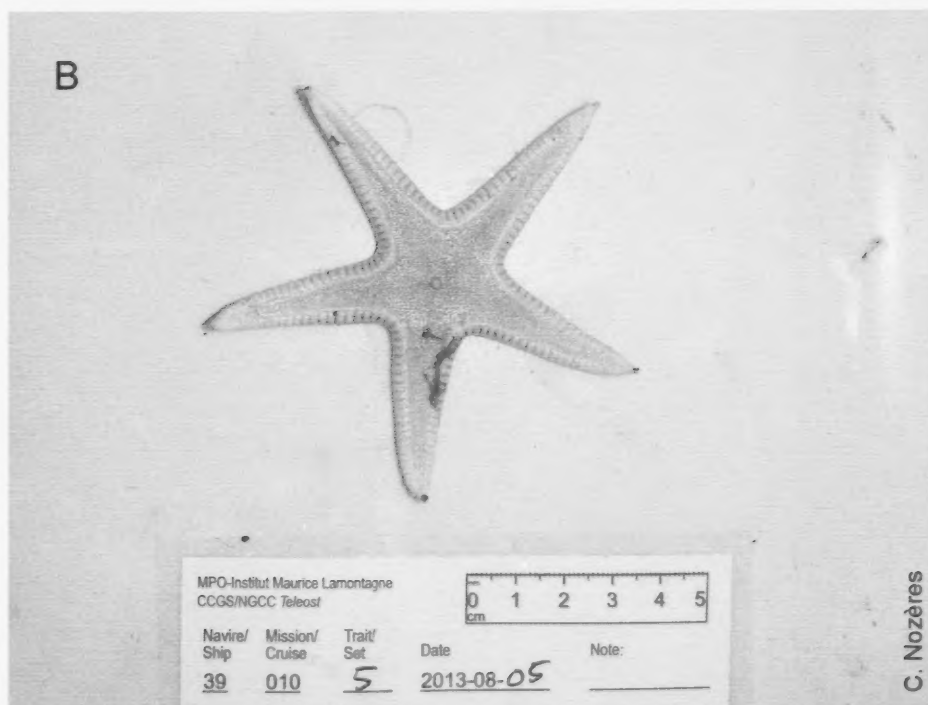
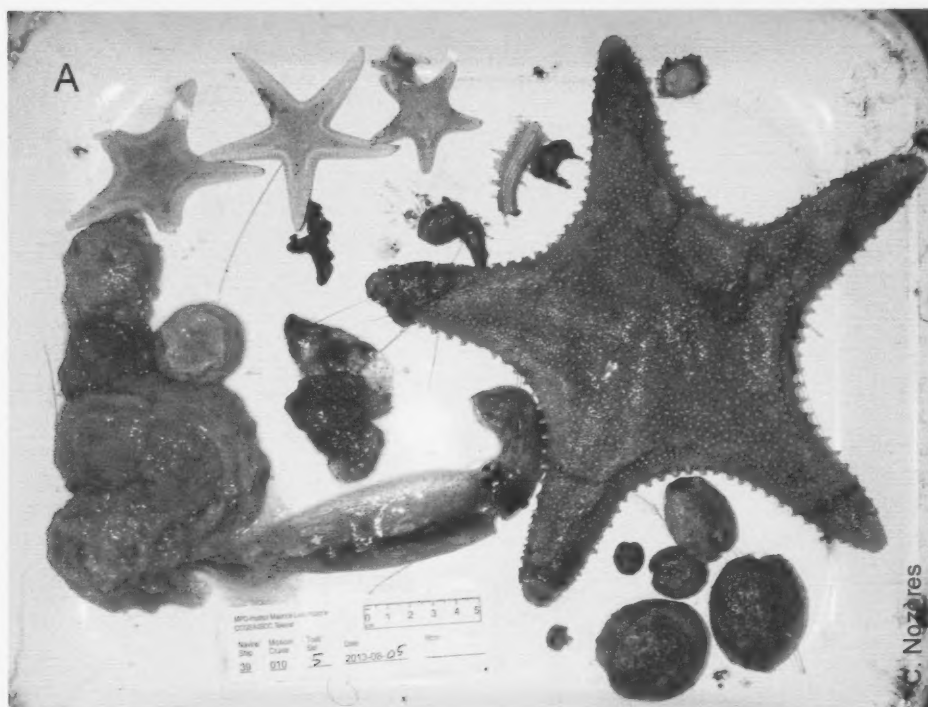


Figure 3. Example photos of captures: (A) group with more than 3 taxa, (B) single taxon.

Appendix 1. Cnidaria

Examples in images, with their taxonomic names, WoRMS code (AphiaID), DFO-Quebec regional code (MPO-QC), and years in which they were seen (Photos). The order of images is selected to help compare similar species, first with common taxa, followed by rare captures.

List of presented taxa (alphabetical by subgroup)

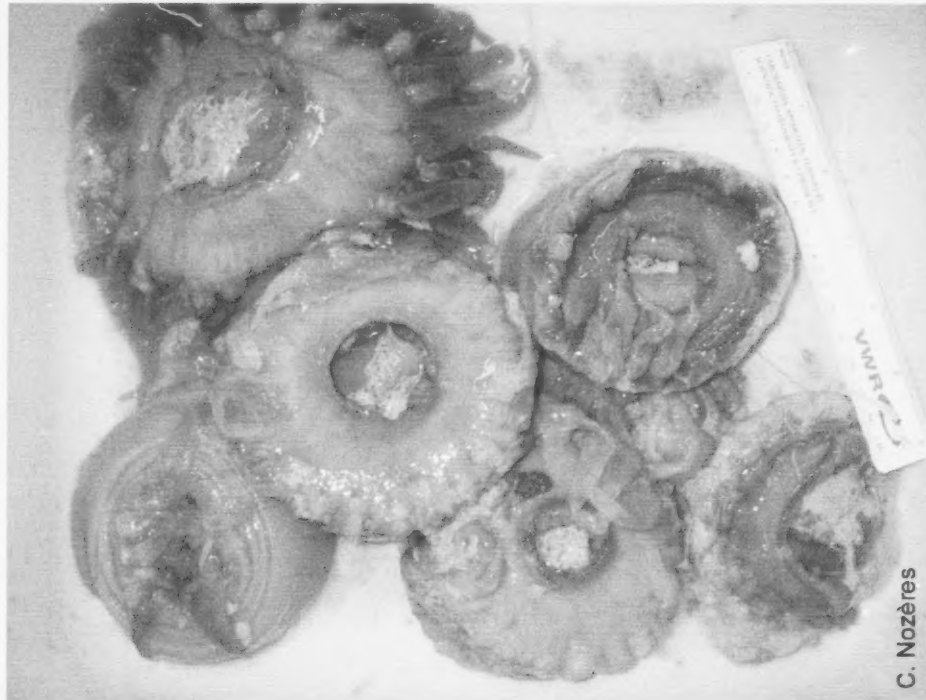
Class	Order	Name
Anthozoa	Actiniaria	<i>Actinauge cristata</i>
		<i>Actinostola callosa</i>
		<i>Bolocera tuediae</i>
		<i>Hormathia nodosa</i>
		<i>Liponema multicornis</i>
		<i>Stephanauge nexilis</i>
		<i>Stomphia coccinea</i>
		<i>Urticina felina</i>
	Pennatulacea	<i>Anthoptilum grandiflorum</i>
		<i>Halipteris finmarchica</i>
		<i>Pennatula grandis</i>
		<i>Pennatula aculeata</i>
	Alcyonacea	<i>Drifa glomerata</i>
		<i>Duva florida</i>
		<i>Gersemia rubiformis</i>
	Scleractinia	<i>Flabellum alabastrum</i>
	Zoanthidea	<i>Epizoanthus erdmanni</i>
		<i>Epizoanthus incrustatus</i>
Hydrozoa	Leptothecata	<i>Ptychogena lactea</i>
		<i>Staurostoma mertensii</i>
		<i>Thuiaria thuja</i>
Scyphozoa	Coronatae	<i>Atolla wyvillei</i>
		<i>Periphylla periphylla</i>
	Semaestomatae	<i>Aurelia aurita</i>
		<i>Cyanea capillata</i>
	Stauromedusae	<i>Lucernaria quadricornis</i>

Cnidaria - Actiniaria

Bolocera tuediae (Johnston, 1832)

AphiaID: 100817 MPO-QC: 2158 Photos: 2005-2013

mistaken for *Liponema multicornis*, *Urticina felina*



Cnidaria - Actiniaria

***Liponema multicornis* (Verrill, 1880)**

AphiaID: **593072** MPO-QC: **2207** Photos: **2006-2013**

mistaken for *Bolocera tuediae*, *Urticina felina*

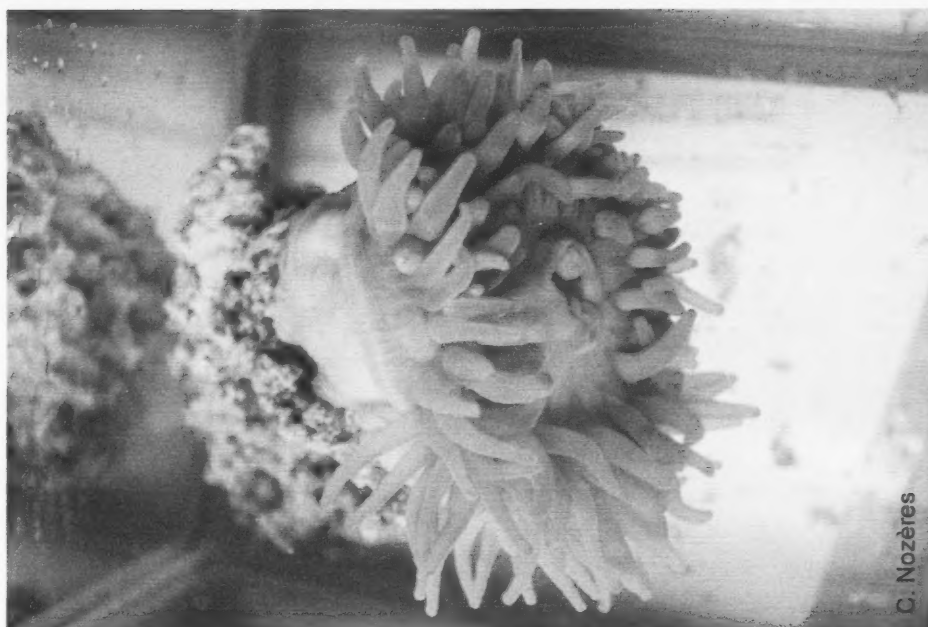


Cnidaria - Actiniaria

Urticina felina (Linnaeus, 1761)

AphiaID: **100834** MPO-QC: **2176** Photos: **2007**

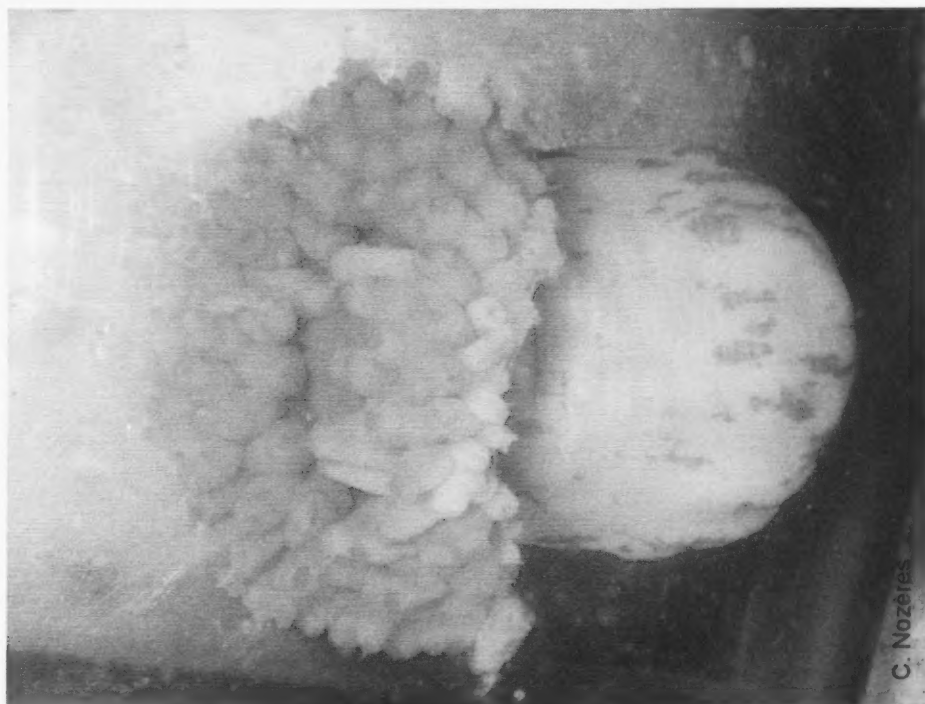
mistaken for *Bolocera tuediae*, *Stomphia coccinea*



Cnidaria - Actiniaria

Stomphia coccinea (Müller, 1776)

AphiaID: **100854** MPO-QC: **2173** Photos: **2006-2013**
mistaken for *Urticina felina*



Cnidaria - Actiniaria

Actinostola callosa (Verrill, 1882)

AphiaID: 100839 MPO-QC: 2162 Photos: 2005-2013
mistaken for *Actinauge cristata*

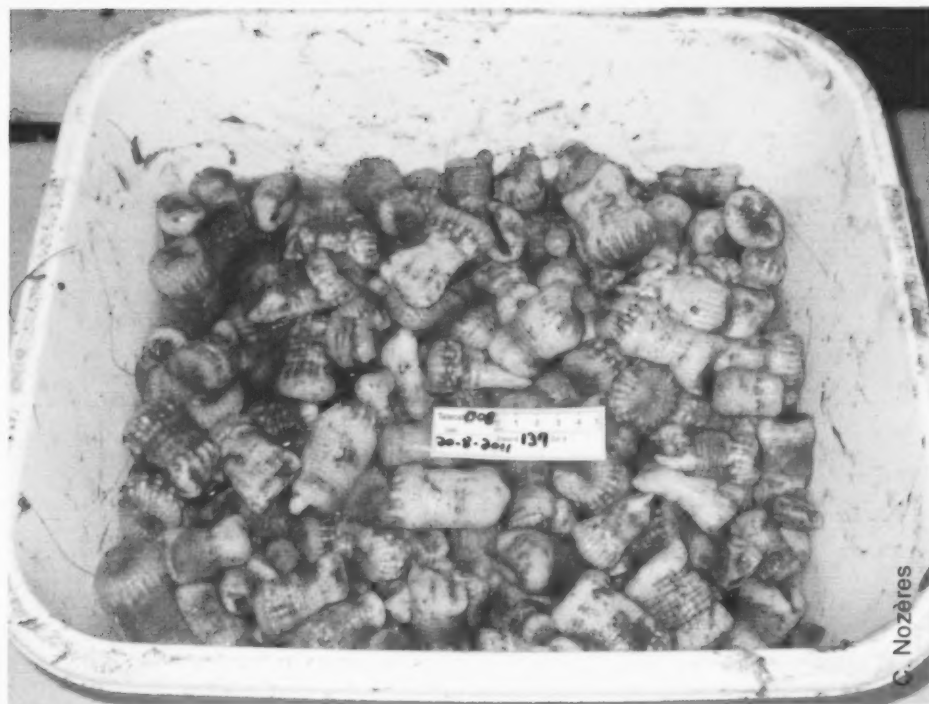
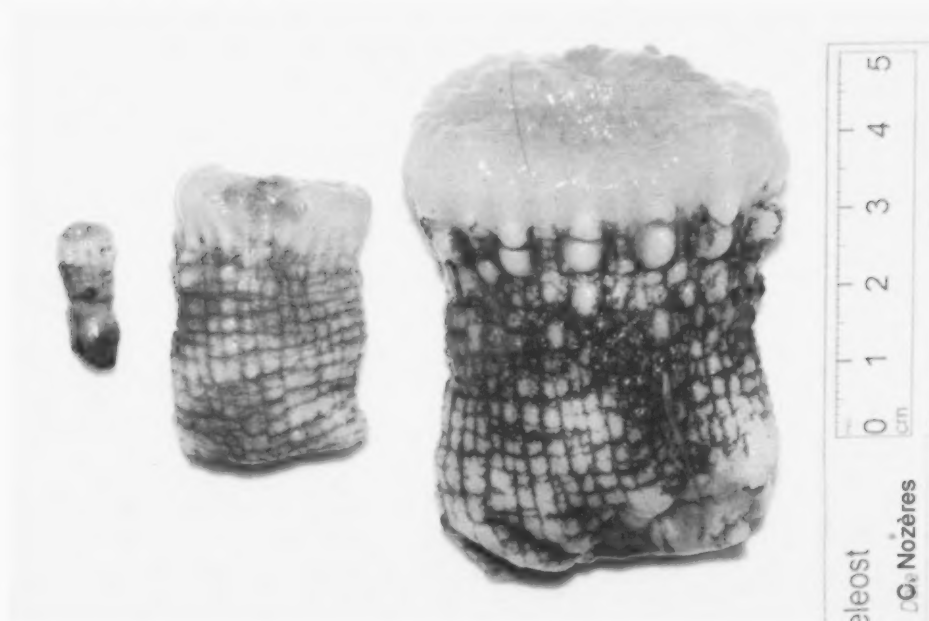


Cnidaria - Actiniaria

Actinauge cristata (Riemann-Zürneck, 1986)

AphiaID: 158210 MPO-QC: 2182 Photos: 2006-2013

mistaken for *Actinostola cristata*, *Hormathia nodosa*



Cnidaria - Actiniaria

Hormathia nodosa (Fabricius, 1780)

AphiaID: 100954 MPO-QC: 2167 Photos: 2006-2013

mistaken for *Actinauge cristata*



Cnidaria - Actiniaria

Stephanauge nexilis (Verrill, 1883)

AphiaID: 158258 MPO-QC: 2159 Photos: 2006-2013

attaches to ends of sea pens



Cnidaria - Pennatulacea

Halopteris finmarchica (Sars, 1851)

AphiaID: 128509 MPO-QC: 2217 Photos: 2006-2013

mistaken for *Anthoptilum grandiflorum*



Cnidaria - Pennatulacea

Anthoptilum grandiflorum (Verrill, 1879)

AphiaID: 128504 MPO-QC: 2218 Photos: 2006-2013

mistaken for *Halopteris finmarchica*, *Pennatula grandis*



Cnidaria - Pennatulacea

Pennatula grandis Ehrenberg, 1834

AphiaID: 128516 MPO-QC: 2210 Photos: 2006-2013

mistaken for *Anthoptilum grandiflorum*, *Pennatula aculeata*

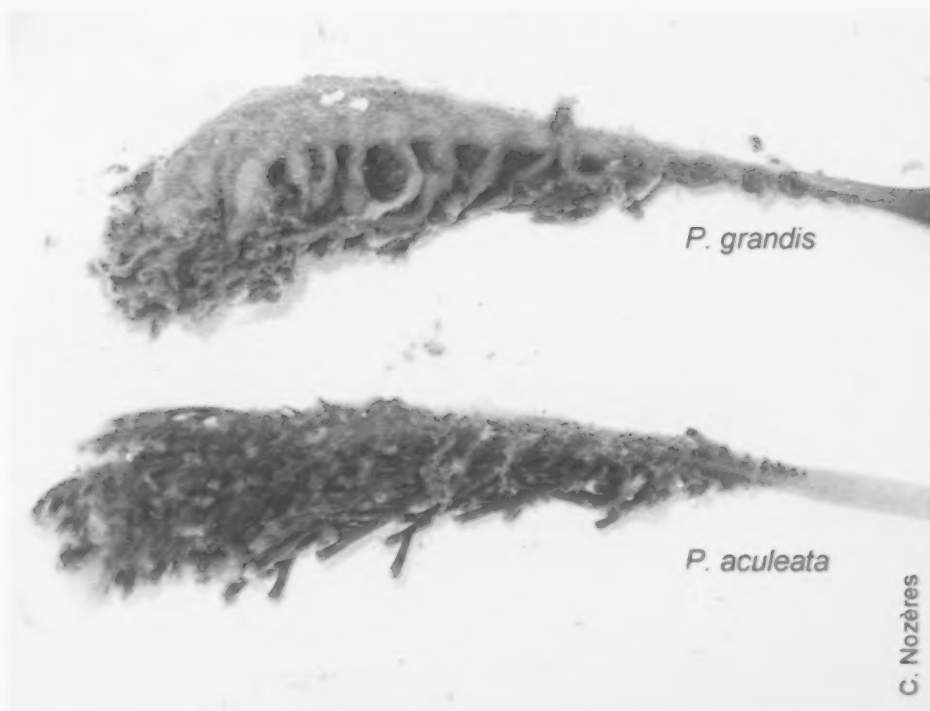


Cnidaria - Pennatulacea

Pennatula aculeata Danielssen, 1860

AphiaID: 128515 MPO-QC: 2203 Photos: 2006-2013

mistaken for *Pennatula grandis*



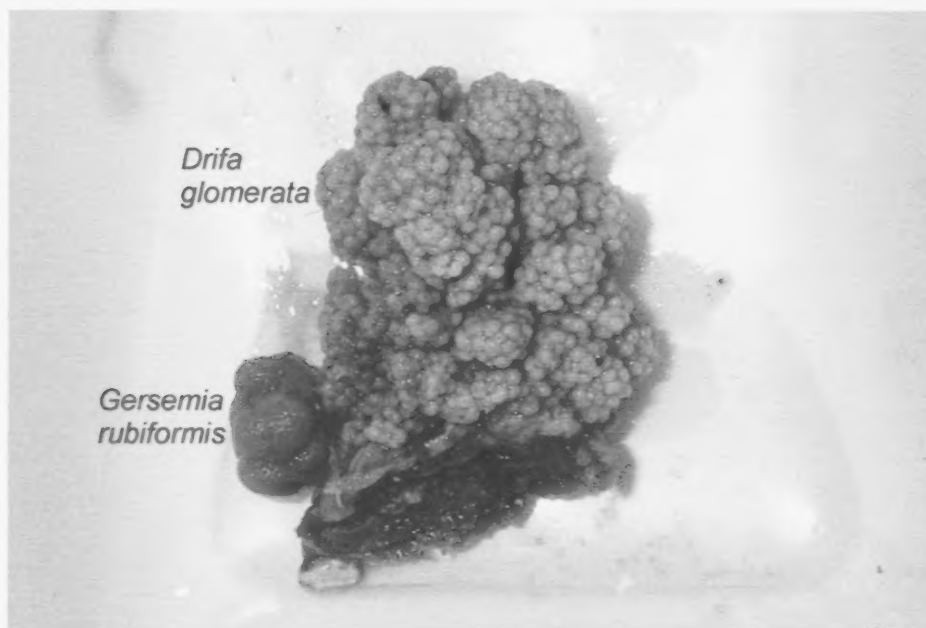
Cnidaria - Alcyonacea

Drifa glomerata Verrill, 1869

AphiaID: **146941** MPO-QC: **2191**

Photos: **2006-2013 (Nephtheidae)**

mistaken for *Gersemia rubiformis*, *Duva florida*



Cnidaria - Alcyonacea

Duva florida (Rathke, 1806)

AphiaID: 146943 MPO-QC: 2183

Photos: 2006-2013 (Nephtheidae)

mistaken for *Drifa glomerata*



Cnidaria - Alcyonacea

Gersemia rubiformis (Ehrenberg, 1834)

AphiaID: 156103 MPO-QC: 2184

Photos: 2006-2013 (Nephtheidae)
mistaken for *Drifa glomerata*



Cnidaria - Scleractinia

Flabellum alabastrum Moseley in Thomson, 1873

AphiaID: 135194 MPO-QC: 2224 Photos: 2006-2013

sole species of stony coral seen in captures



Cnidaria - Zoanthidea

Epizoanthus erdmanni (Danielssen, 1890)

AphiaID: 101027 MPO-QC: 2156 Photos: 2008-2010, 2012, 2013
mistaken for Polychaeta



Epizoanthus incrustatus Düben & Koren, 1847

AphiaID: 150642 MPO-QC: 2178 Photos: 2007

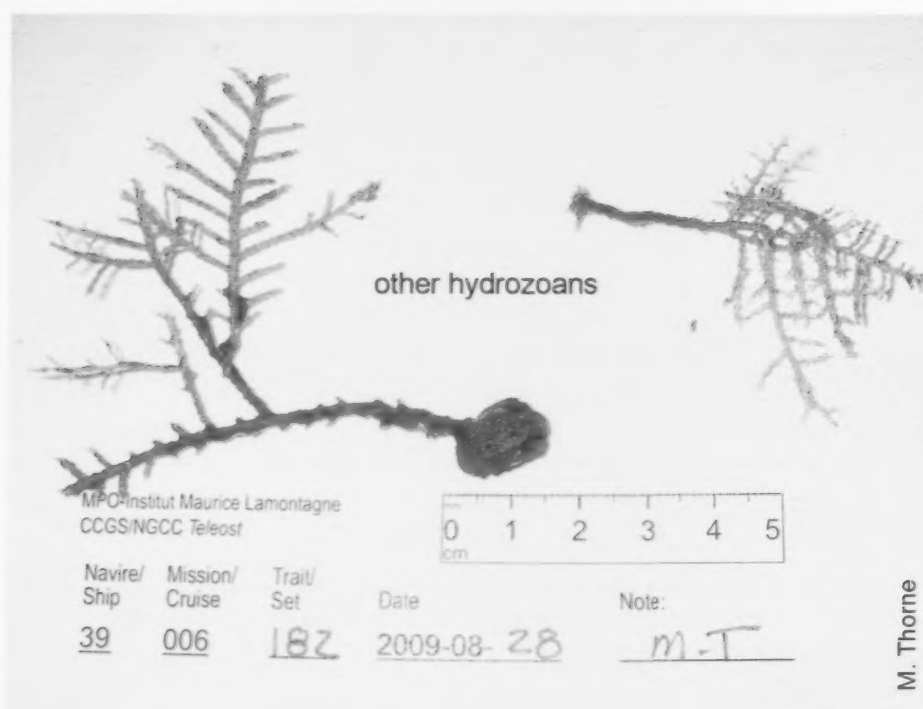
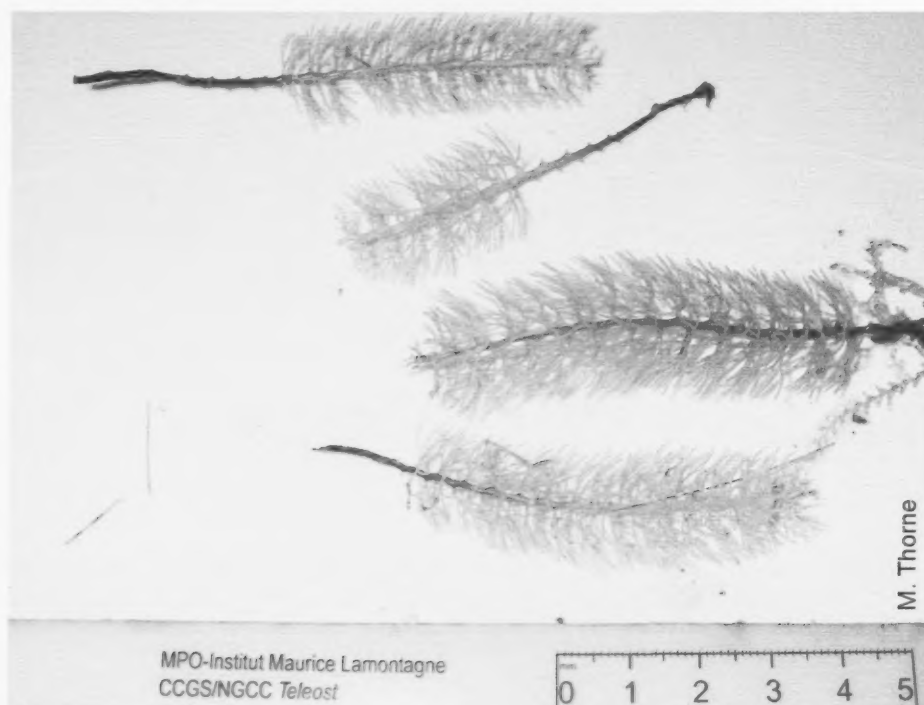


Cnidaria - Hydrozoa

Thuiaria thuja (Linnaeus, 1758)

AphiaID: **117940** MPO-QC: **1357** Photos: **2006-2013**

one of many hydrozoan species in captures

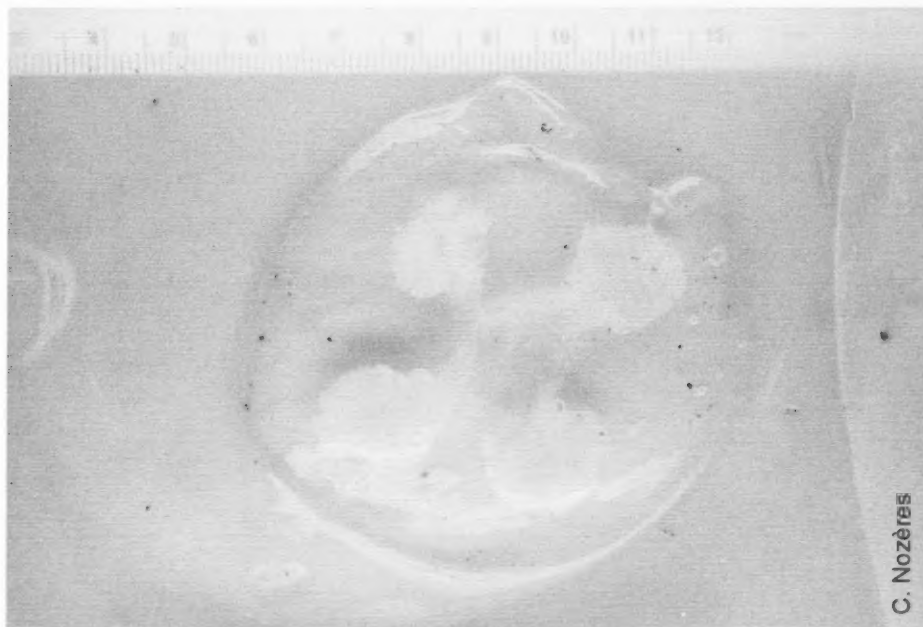


Cnidaria - Hydrozoa

Ptychogena lactea (Agassiz, 1865)

AphiaID: 117728 MPO-QC: 1353 Photos: 2006-2013

mistaken for *Staurostoma mertensii* (Hydrozoa) or *Aurelia aurita* (Scyphozoa)

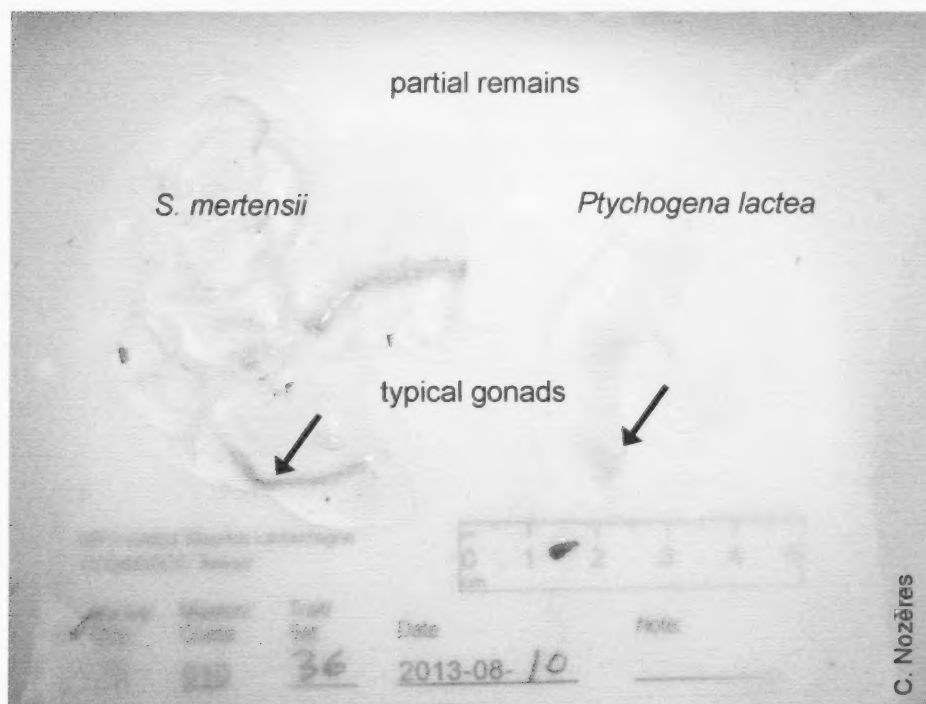


Cnidaria - Hydrozoa

Staurostoma mertensii (Brandt, 1834)

AphiaID: **594013** MPO-QC: **1352** Photos: **2011, 2013**

mistaken for *Ptychogena lactea* (Hydrozoa) or *Aurelia aurita* (Scyphozoa)



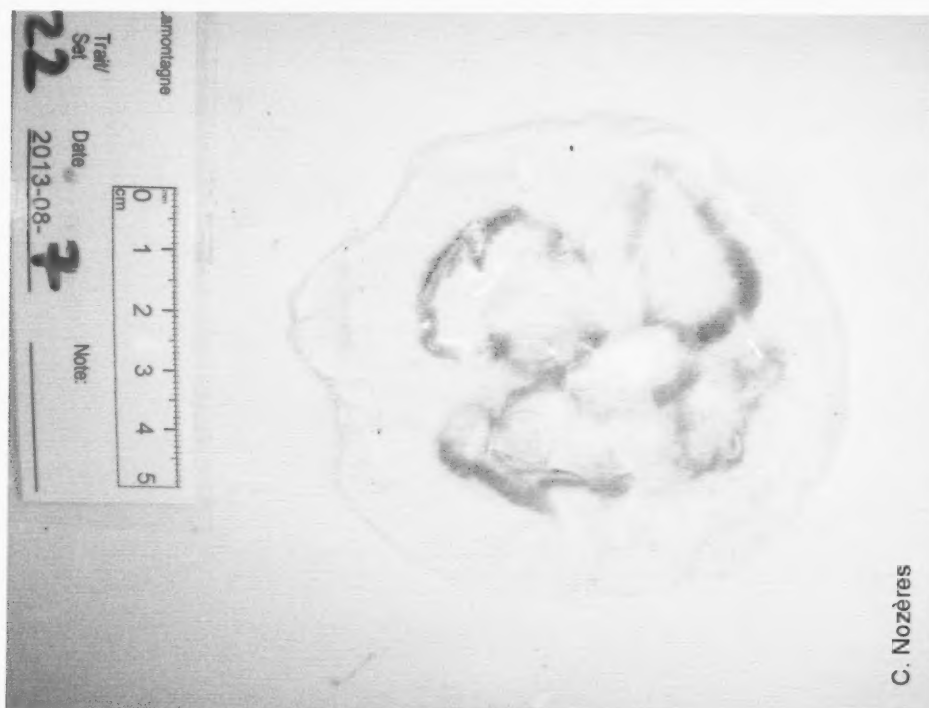
Cnidaria - Hydrozoa

Aurelia aurita (Linnaeus, 1758)

AphiaID: 135306 MPO-QC: 2085

Photos: 2011, 2013

mistaken for *Cyanea capillata*, *Ptychogena lactea*, *Staurostoma mertensii*



Cnidaria - Scyphozoa

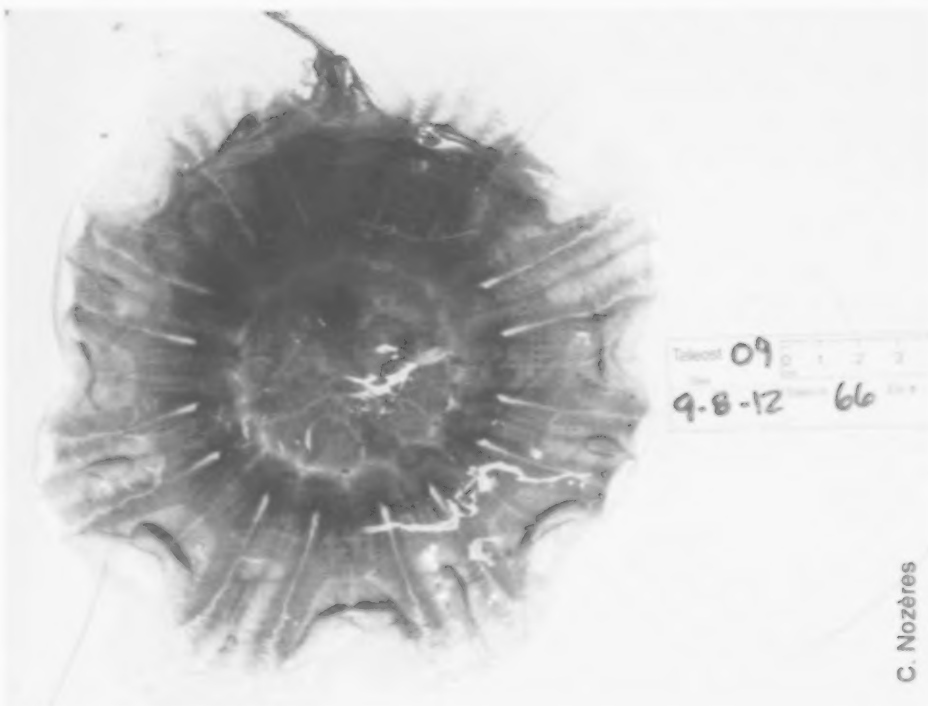
Cyanea capillata (Linnaeus, 1758)

AphiaID: 135301 MPO-QC: 2080 Photos: 2007-2013

mistaken for *Periphylla periphylla*, *Ptychogena lactea*



C. Nozères



C. Nozères

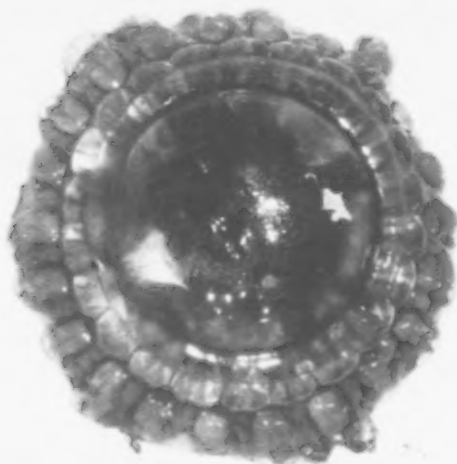
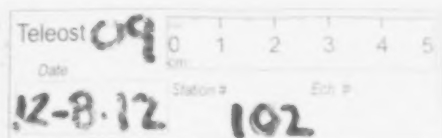
Cnidaria - Scyphozoa

Atolla wyvillei (Haeckel, 1880)

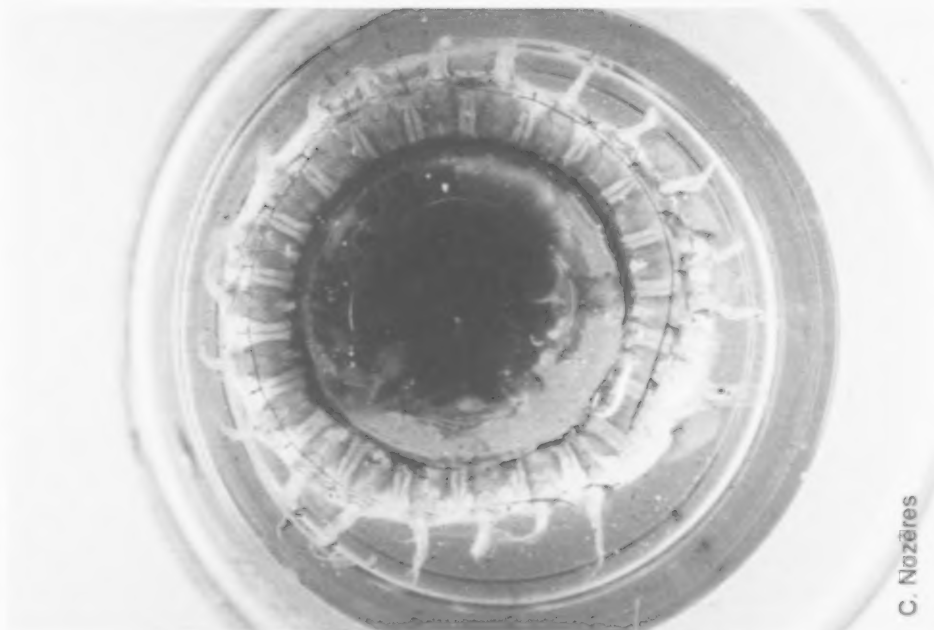
AphiaID: 135282 MPO-QC: 2097

Photos: 2007-2013

mistaken for *Periphylla periphylla*



J. Gauthier



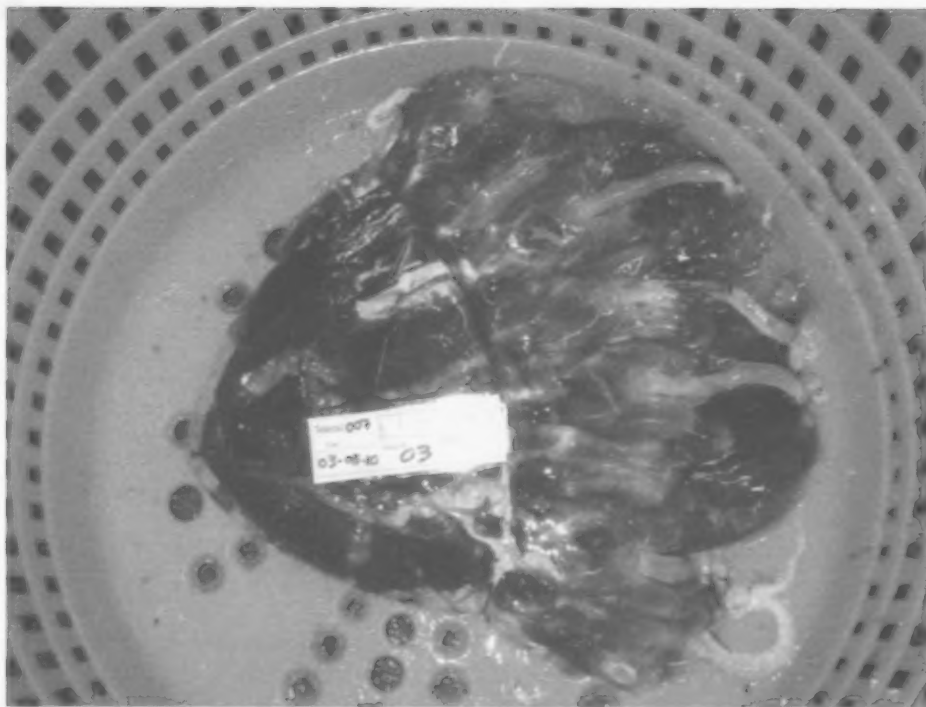
C. Nozères

Cnidaria - Scyphozoa

Periphylla periphylla (Péron & Lesueur, 1810)

AphiaID: 135294 MPO-QC: 2096 Photos: 2007-2013

mistaken for *Atolla wyvillei*

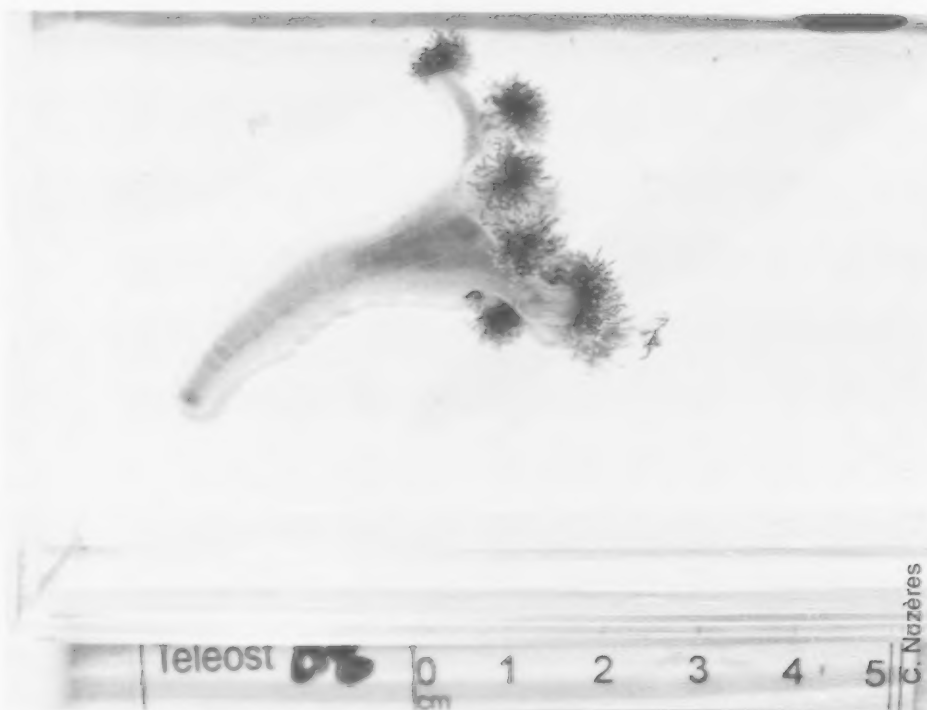


Cnidaria - Stauromedusae

Lucernaria quadricornis (O. F. Müller, 1776)

AphiaID: 135328 MPO-QC: 2050

Photos: 2011-2012



Appendix 2. Echinodermata

Examples in images, with their taxonomic names, WoRMS code (AphiaID), DFO-Quebec regional code (MPO-QC), and years in which they were seen (Photos). The order of images is selected to help with comparisons. Species still to be confirmed are marked (*).

List of presented taxa (alphabetical by subgroup)

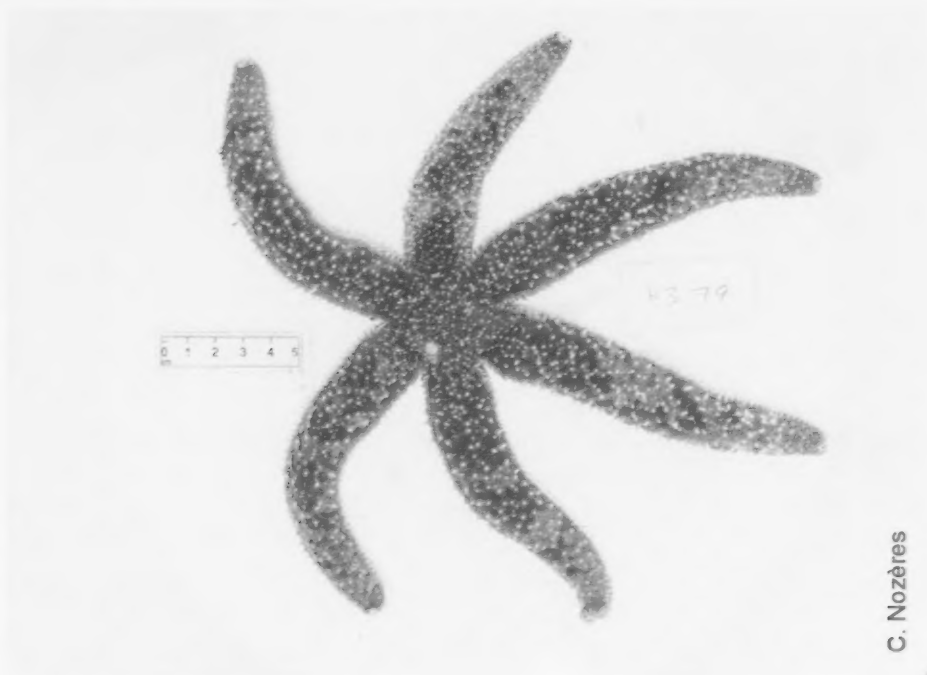
Class	Name
Asteroidea	<i>Ceramaster granularis</i>
	<i>Crossaster papposus</i>
	<i>Ctenodiscus crispatus</i>
	<i>Diplopteraster multipes</i>
	<i>Henricia</i> sp.
	<i>Hippasteria phrygiana</i>
	<i>Leptasterias polaris</i>
	<i>Leptasterias</i> sp.
	<i>Leptychaster arcticus</i>
	<i>Novodinia americana</i>
	<i>Poraniomorpha</i> sp.
	<i>Pseudarchaster parelii</i>
	<i>Psilaster andromeda</i>
	<i>Pteraster militaris</i>
	<i>Pteraster obscurus</i>
	<i>Pteraster pulvillus</i>
	<i>Solaster endeca</i>
	<i>Stephanasterias albula</i>
	<i>Tremaster mirabilis</i>
	<i>Urasterias lincki</i>
Ophiuroidea	<i>Amphiura</i> sp.
	<i>Gorgonocephalus</i> sp.
	<i>Ophiacantha bidentata</i>
	<i>Ophiocten sericeum</i> *
	<i>Ophiopholis aculeata</i>
	<i>Ophiopus arcticus</i> *
	<i>Ophioscolex glacialis</i>
	<i>Ophiura robusta</i>
	<i>Ophiura sarsii</i>
	<i>Stegophiura nodosa</i>
Echinoidea	<i>Brisaster fragilis</i>
	<i>Echinarachnius parma</i>
	<i>Strongylocentrotus</i> sp.
Holothuroidea	<i>Cucumaria frondosa</i>
	<i>Molpadia oolitica</i>
	<i>Pentamera calcigera</i> *
	<i>Psolus fabricii</i>
	<i>Psolus phantapus</i>

Echinodermata - Asteroidea

Leptasterias polaris (Müller & Troschel, 1842)

AphiaID: 125154 MPO-QC: 8511 Photos: 2006-2013

smaller ones are mistaken for other *Leptasterias* sp.

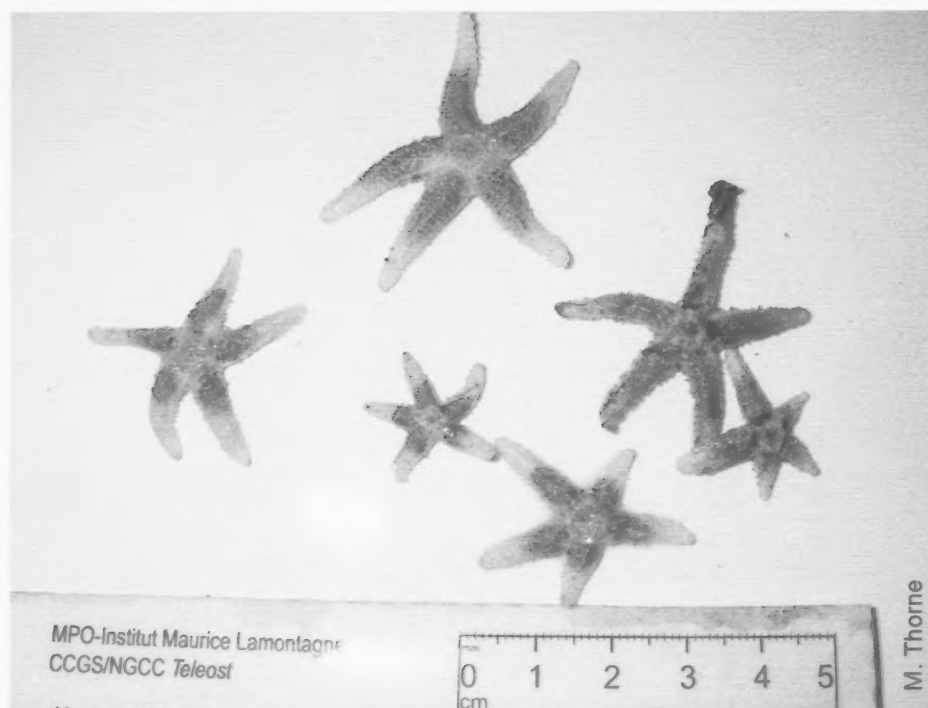


Echinodermata - Asteroidea

***Leptasterias* sp.** (Verrill, 1866)

AphiaID: 123222 MPO-QC: 8510 Photos: 2008-2013

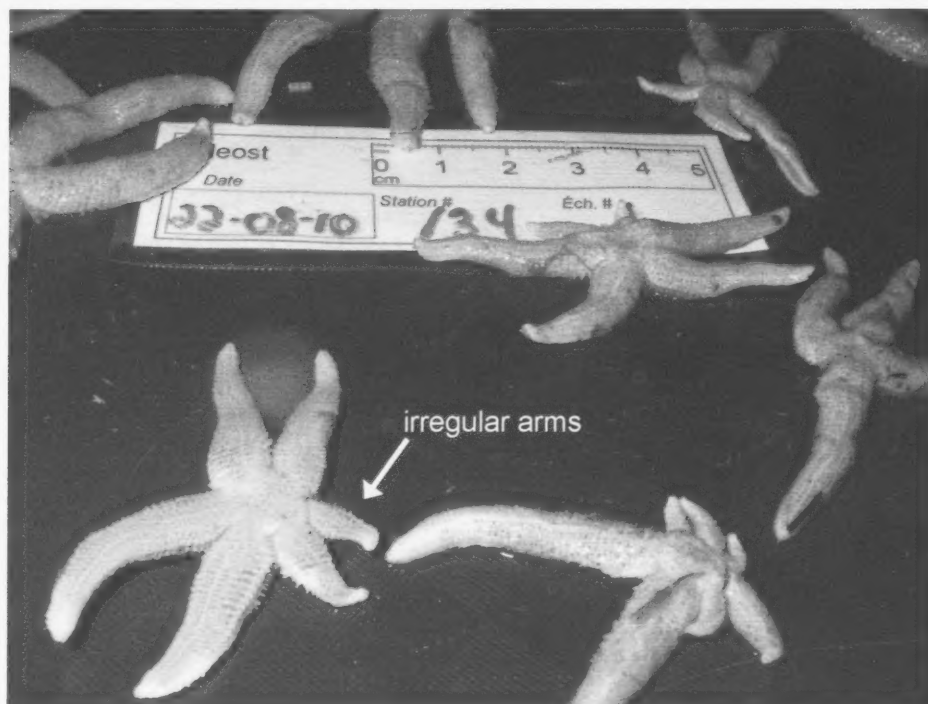
mistaken for *Henricia* sp., *Stephanasterias albula*



Echinodermata - Asteroidea

Stephanasterias albula (Stimpson, 1853)

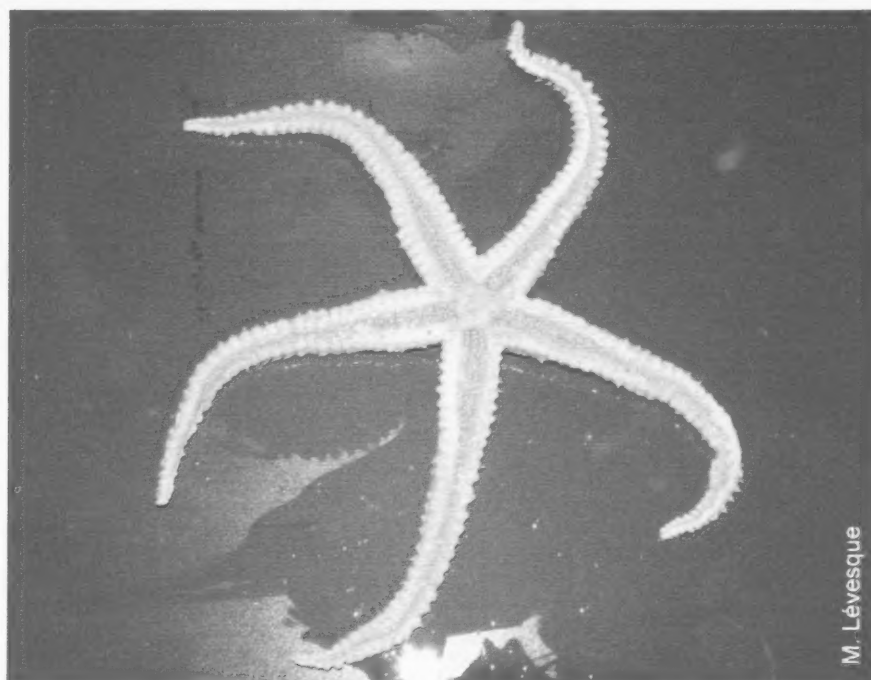
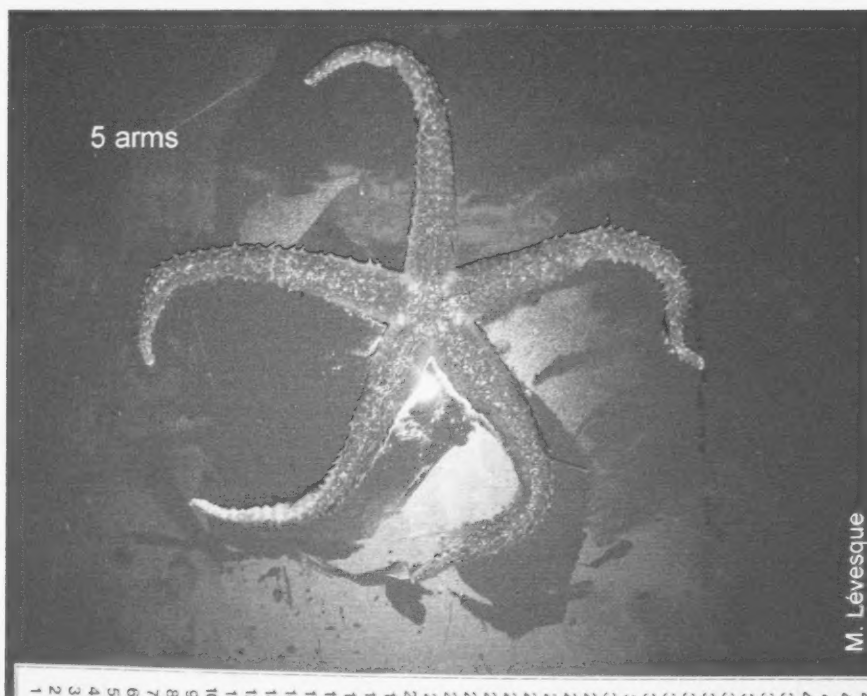
AphiaID: 123808 MPO-QC: 8515 Photos: 2008-2011, 2013
mistaken for *Leptasterias* sp.



Echinodermata - Asteroidea

Urasterias lincki (Müller & Troschel, 1842)

AphialD: 123815 MPO-QC: 8516 Photos: 2005, 2011
mistaken for *Leptasterias* sp., *Asterias* sp. (not seen to date)

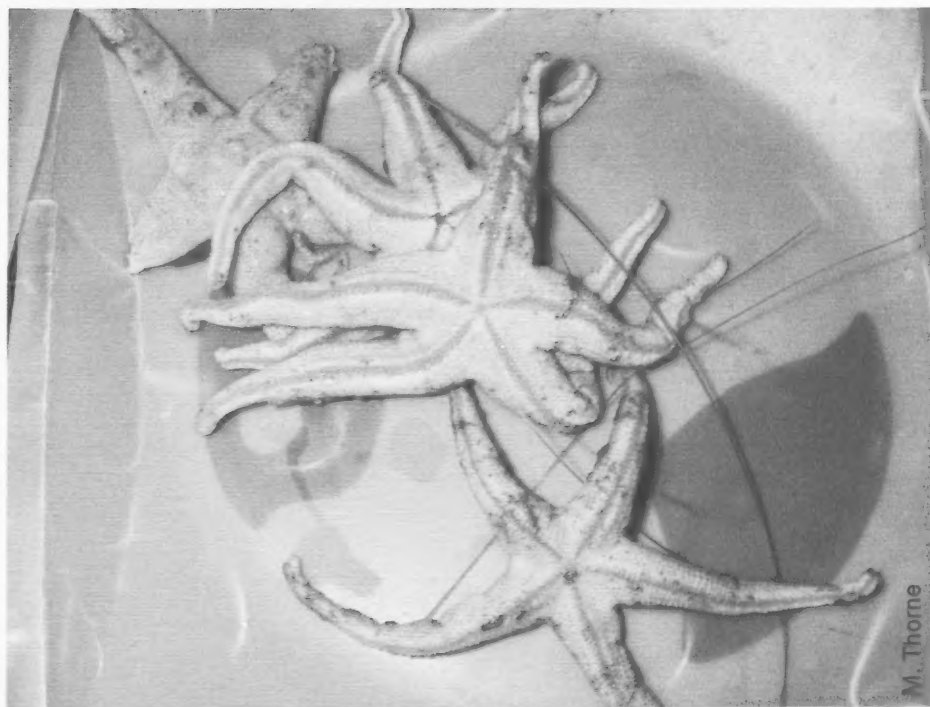
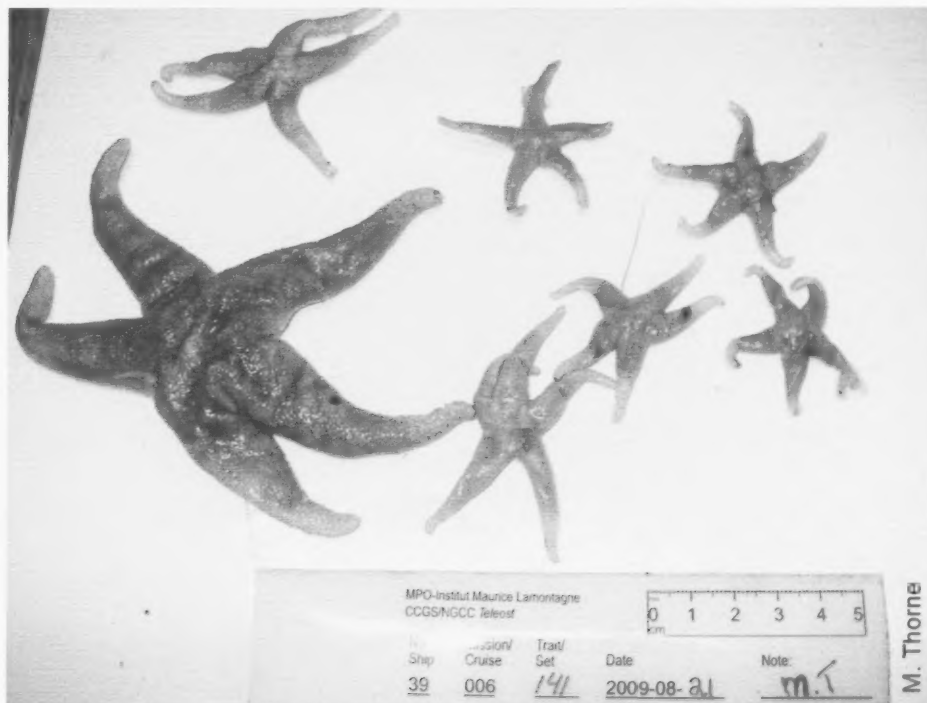


Echinodermata - Asteroidea

***Henricia* sp. Gray, 1840**

AphiaID: 123276 MPO-QC: 8483 Photos: 2005-2013

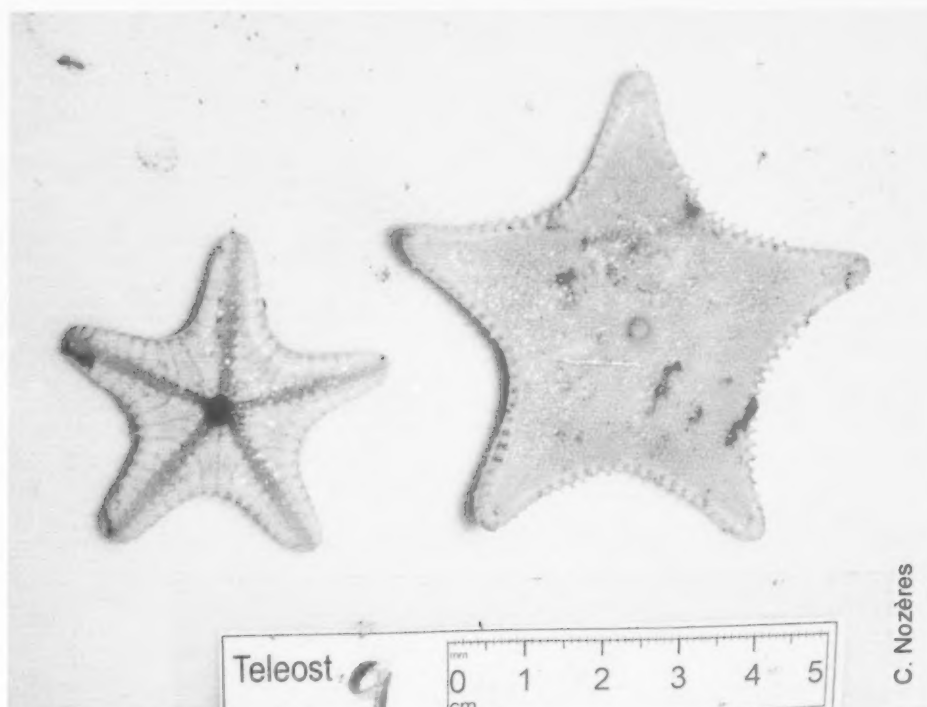
mistaken for *Leptasterias* sp., *Stephanasterias albula*



Echinodermata - Asteroidea

Ctenodiscus crispatus (Retzius, 1805)

AphiaID: 123915 MPO-QC: 8407 Photos: 2005-2013



C. Nozères



C. Nozères

Echinodermata - Asteroidea

Psilaster andromeda (Müller & Troschel, 1842)

AphiaID: 123908 MPO-QC: 8520 Photos: 2006-2013

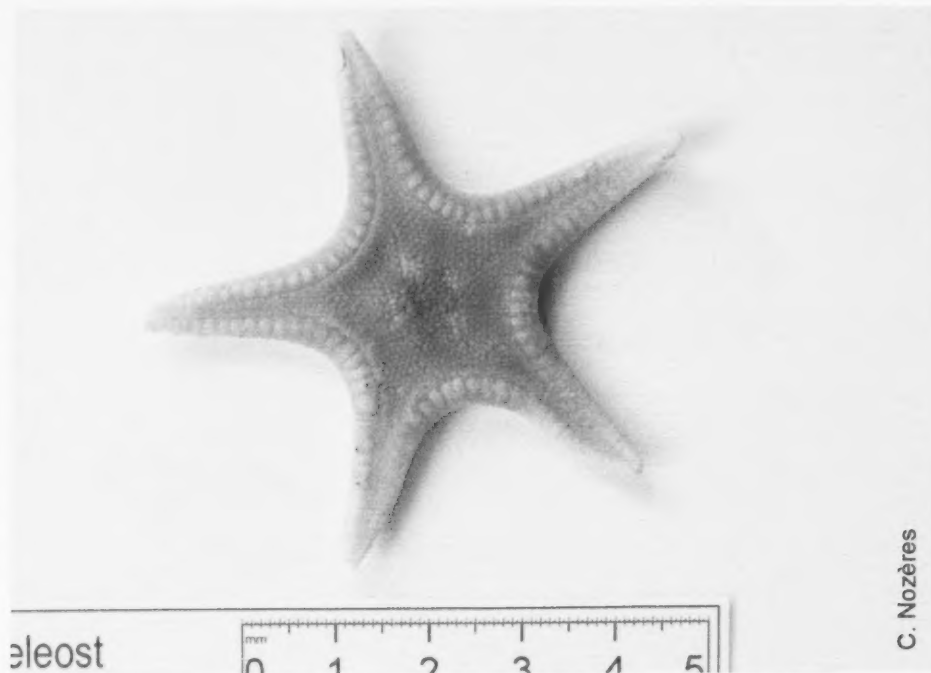


Echinodermata - Asteroidea

Pseudarchaster parelii (Düben & Koren, 1846)

AphiaID: **124085** MPO-QC: **8433** Photos: **2006-2013**

mistaken for *Leptychaster arcticus*



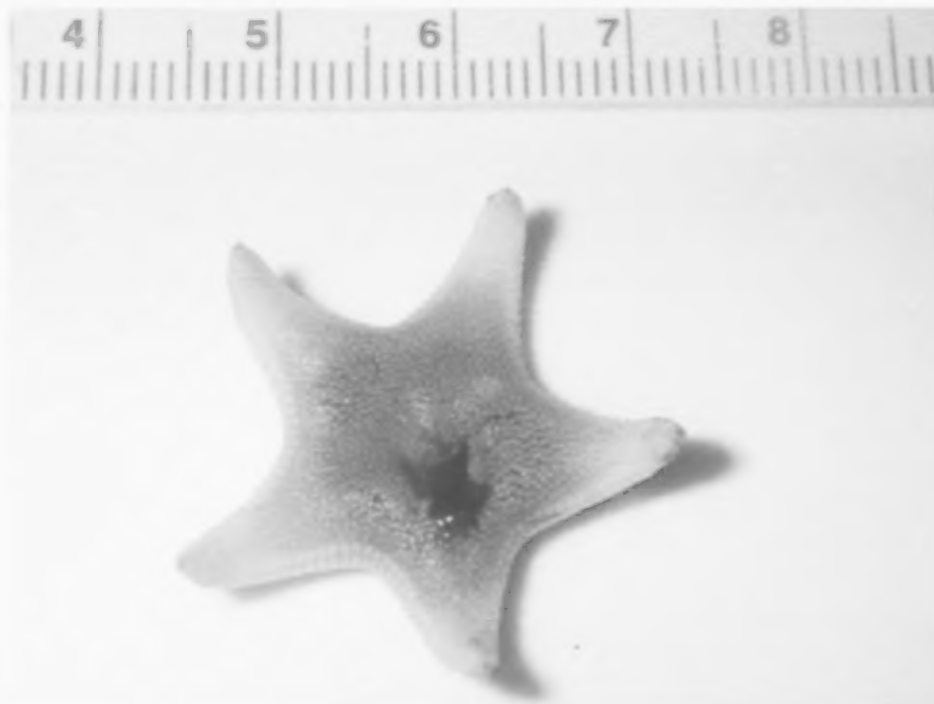
Echinodermata - Asteroidea

Leptychaster arcticus (M. Sars, 1851)

AphiaID: 123896 MPO-QC: 8521

Photos: 2007, 2009, 2011, 2013

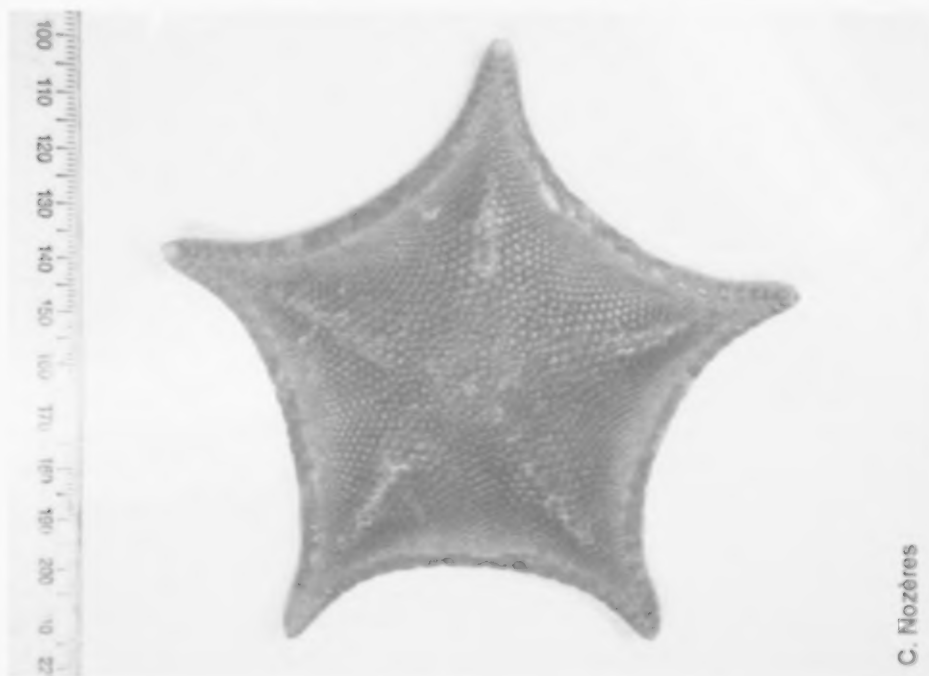
mistaken for *Pseudarchaster parelii*



Echinodermata - Asteroidea

***Ceramaster granularis* (Retzius, 1783)**

AphiaID: 124020 MPO-QC: 8429 Photos: 2006-2013



Echinodermata - Asteroidea

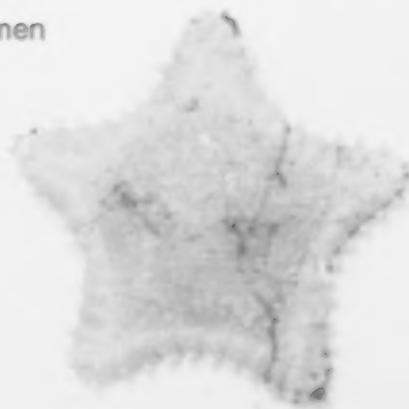
Hippasteria phrygiana (Parelius, 1768)

AphiaID: 124043 MPO-QC: 8431 Photos: 2005-2013

small specimens mistaken for *Ceramaster granularis*



small specimen



Navire	Mission	Trait
3,9	0 0,9	0,95

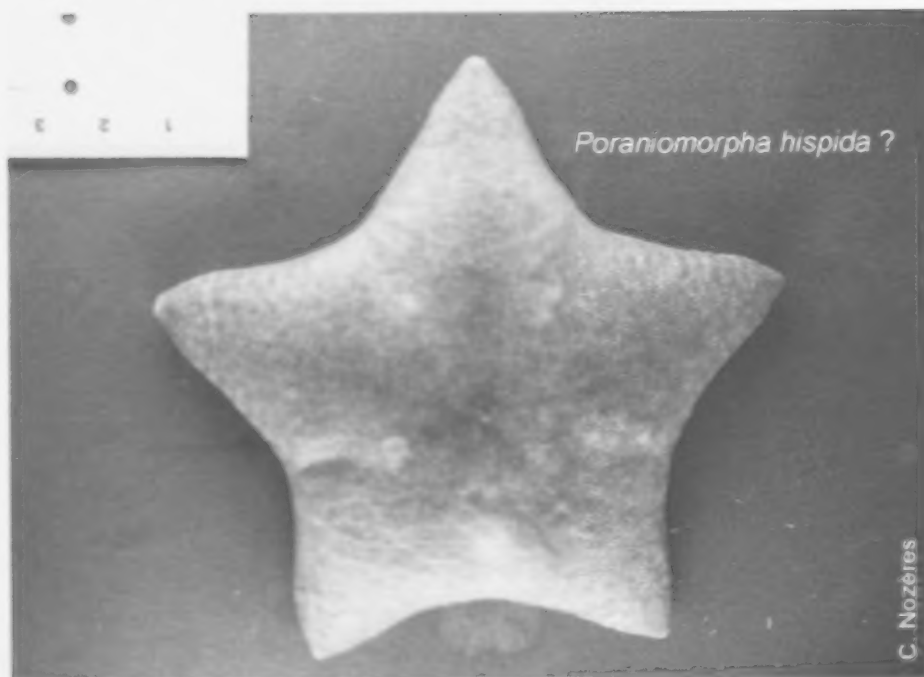
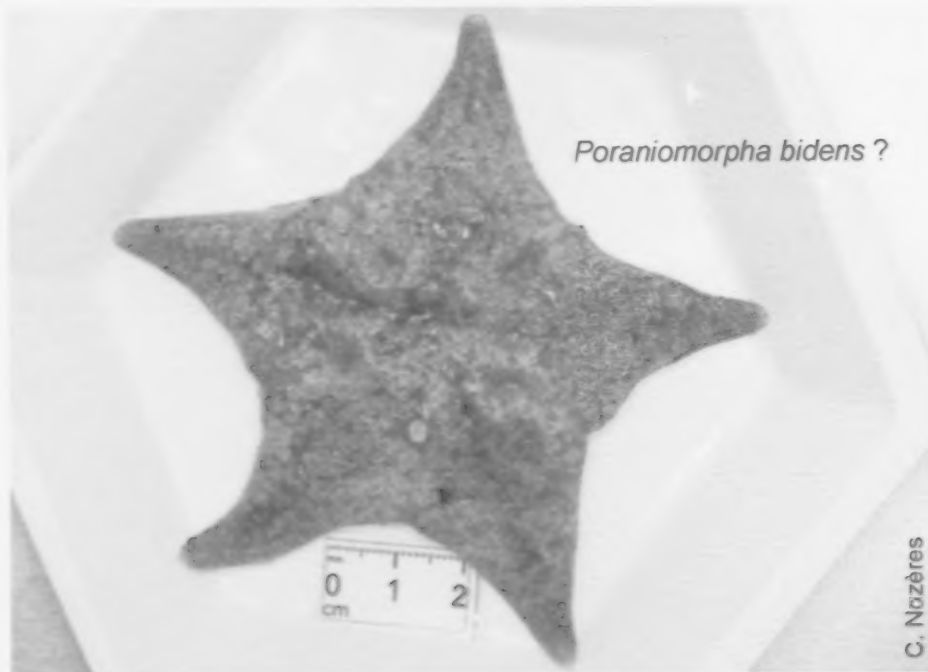
C. Nozères

Echinodermata - Asteroidea

***Poraniomorpha* sp.** Danielssen & Koren, 1891

AphialD: 123321 MPO-QC: 8435 Photos: 2006-2013

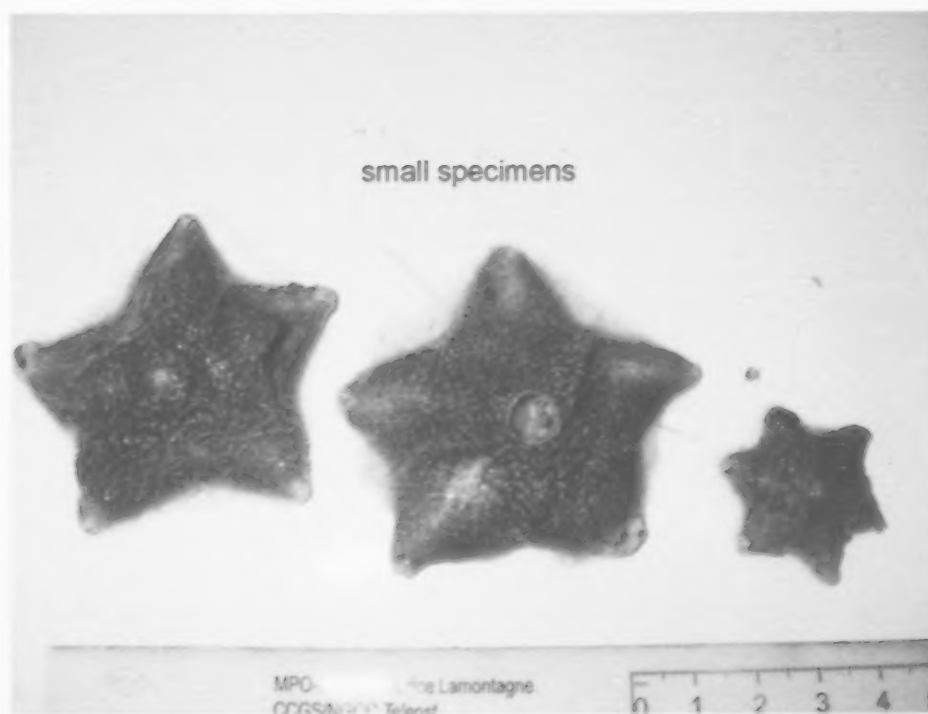
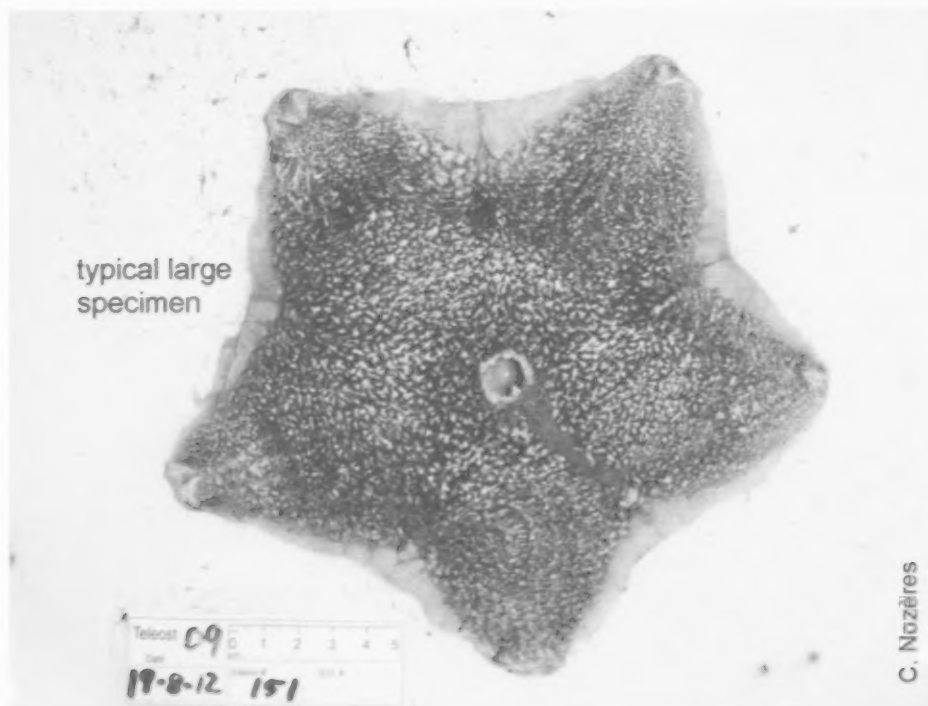
mistaken for *Porania pulvillus* (absent; southern species)



Echinodermata - Asteroidea

Diplopteraster multipes (M. Sars, 1866)

AphiaID: 124128 MPO-QC: 8408 Photos: 2006-2012



Echinodermata - Asteroidea

Pteraster militaris (O.F. Müller, 1776)

AphiaID: 124147 MPO-QC: 8410 Photos: 2006-2013

mistaken for *Pteraster pulvillus*

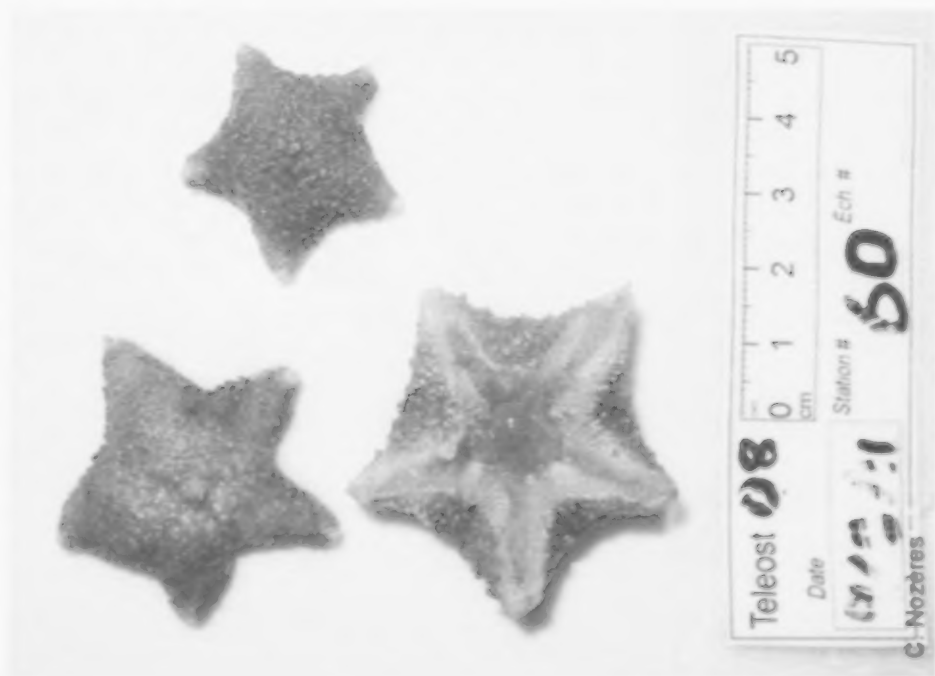


Echinodermata - Asteroidea

Pteraster pulvillus (M. Sars, 1861)

AphiaID: 124151 MPO-QC: 8411 Photos: 2006-2013

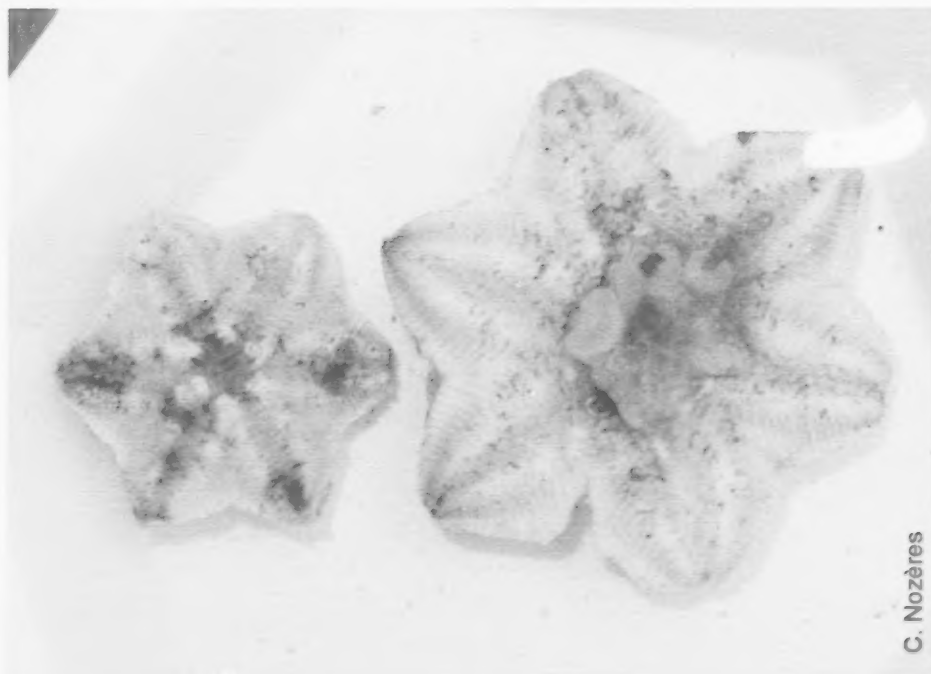
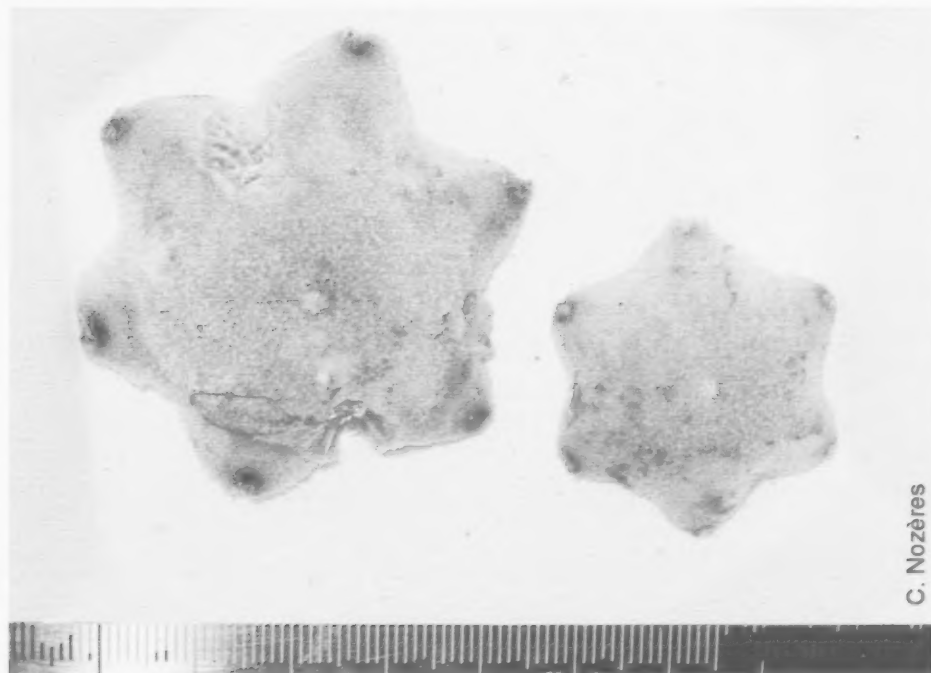
mistaken for *Pteraster militaris*



Echinodermata - Asteroidea

Pteraster obscurus (Perrier, 1891)

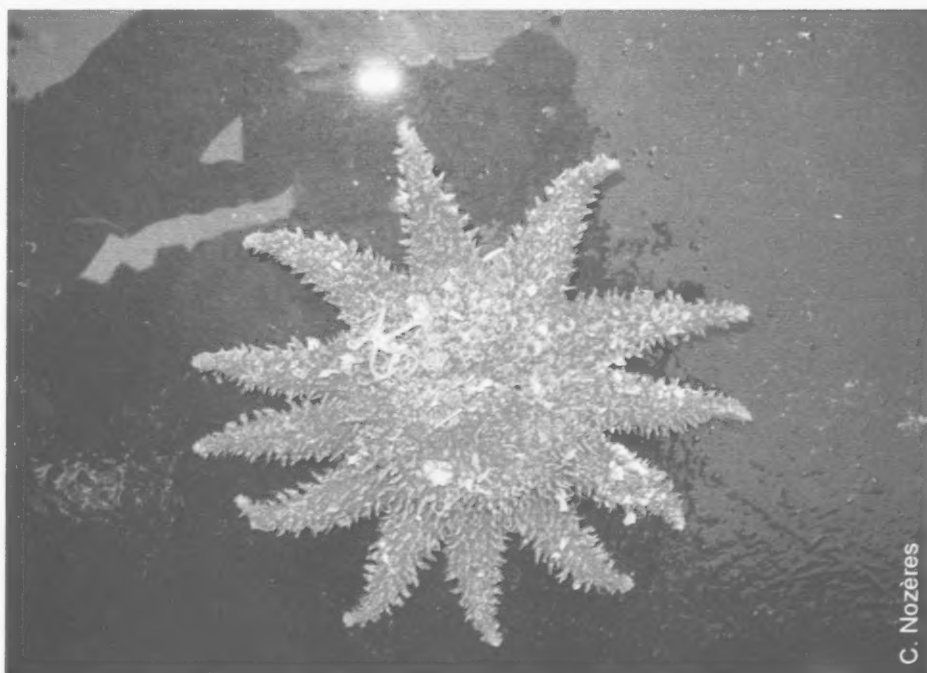
AphiaID: 124149 MPO-QC: 8412 Photos: 2008, 2010, 2011, 2013
mistaken for *Pteraster militaris*, *P. pulvillus*



Echinodermata - Asteroidea

Crossaster papposus (Linnaeus, 1767)

AphiaID: 124154 MPO-QC: 8447 Photos: 2006-2013



C. Nozères

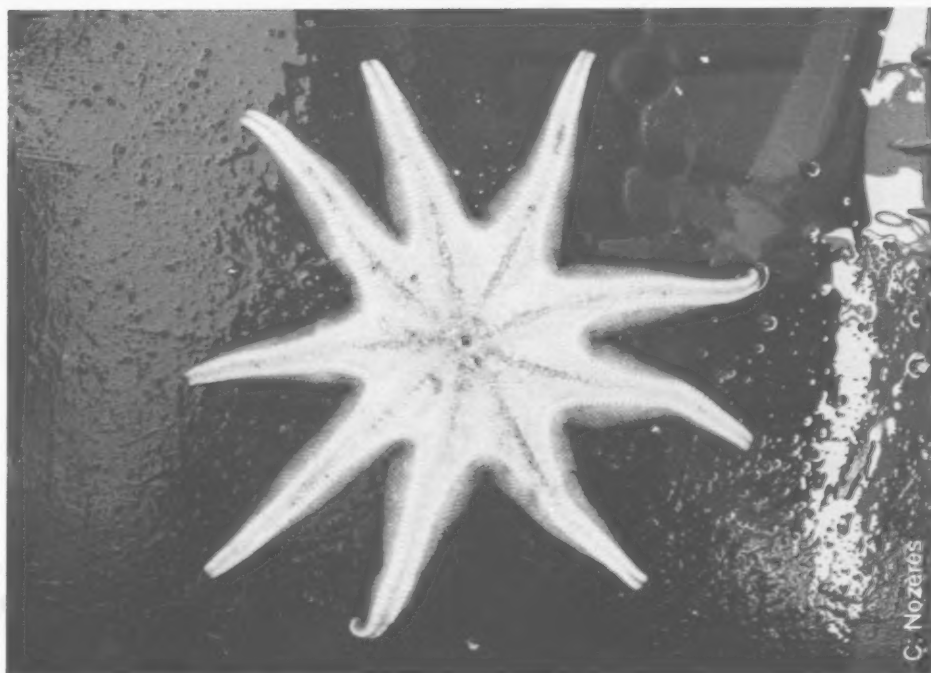
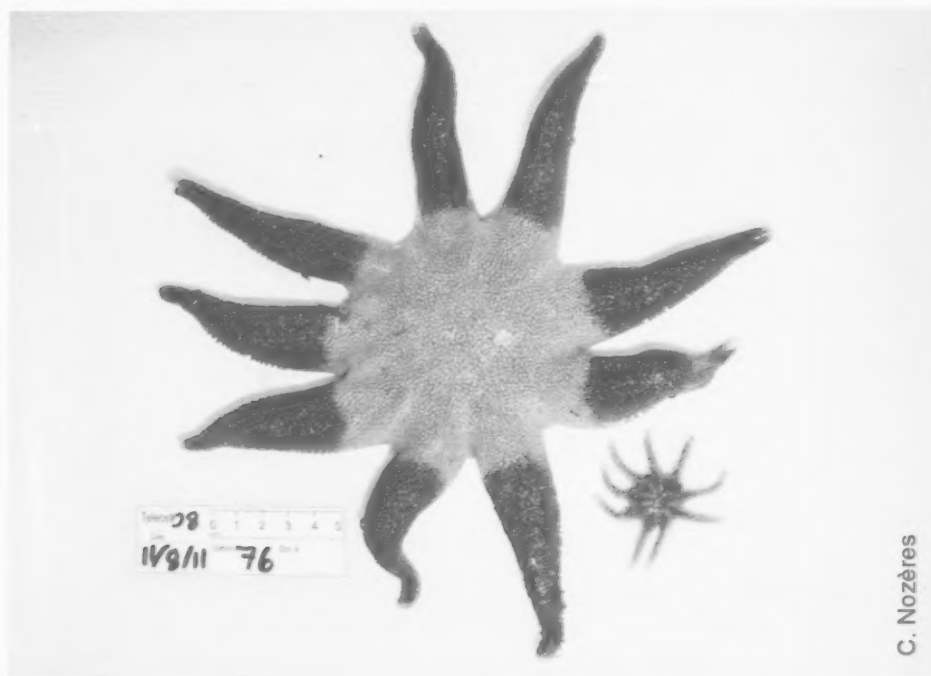


C. Nozères

Echinodermata - Asteroidea

Solaster endeca (Linnaeus, 1771)

AphiaID: 124160 MPO-QC: 8445 Photos: 2006-2012

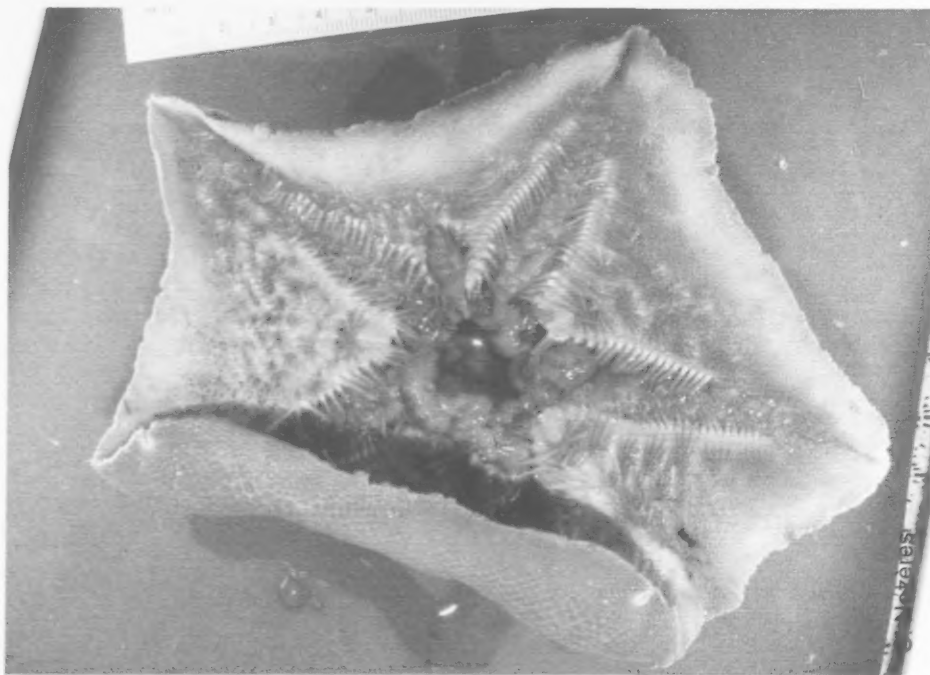
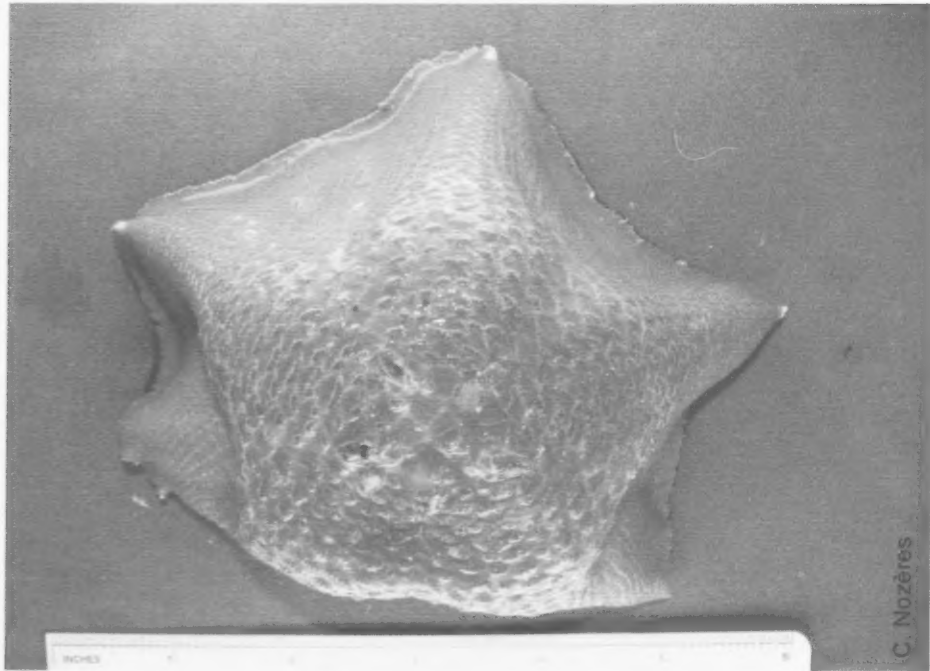


Echinodermata - Asteroidea

Tremaster mirabilis Verrill, 1880

AphiaID: 124002 MPO-QC: 8446 Photos: 2007, 2010, 2013

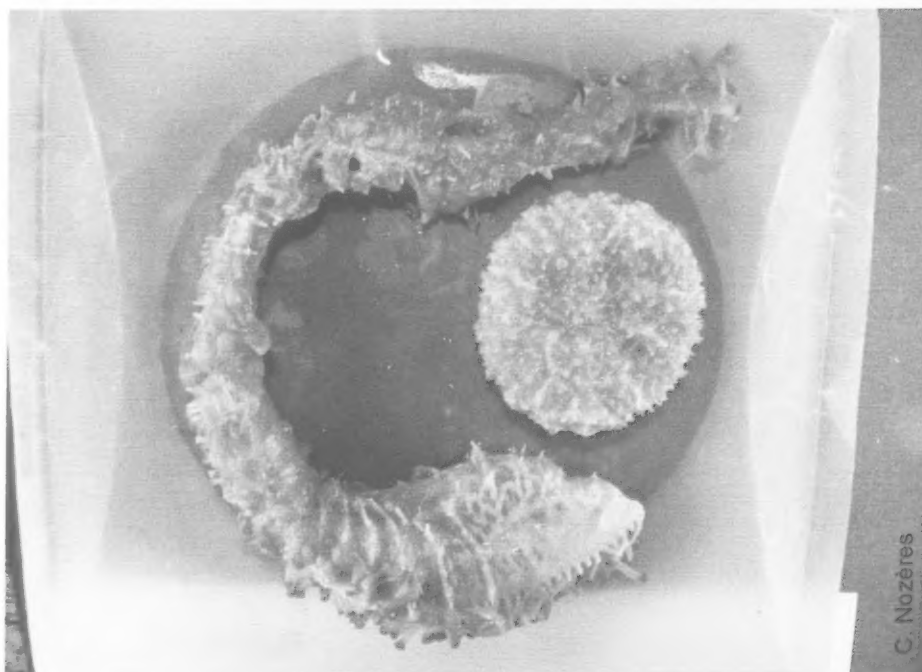
rare and robust deepwater sea star



Echinodermata - Asteroidea

Novodinia americana (Verrill, 1880)

AphiaID: 178261 MPO-QC: 8448 Photos: 2007, 2008, 2010, 2013
rare and fragile deepwater sea star, often in pieces



Echinodermata - Ophiuroidea

Ophiopholis aculeata (Linnaeus, 1767)

AphiaID: 125125 MPO-QC: 8583 Photos: 2006-2013

mistaken for *Ophiacantha bidentata*



C. Nozères



Teleost

9

Date

0

1

2

3

4

5

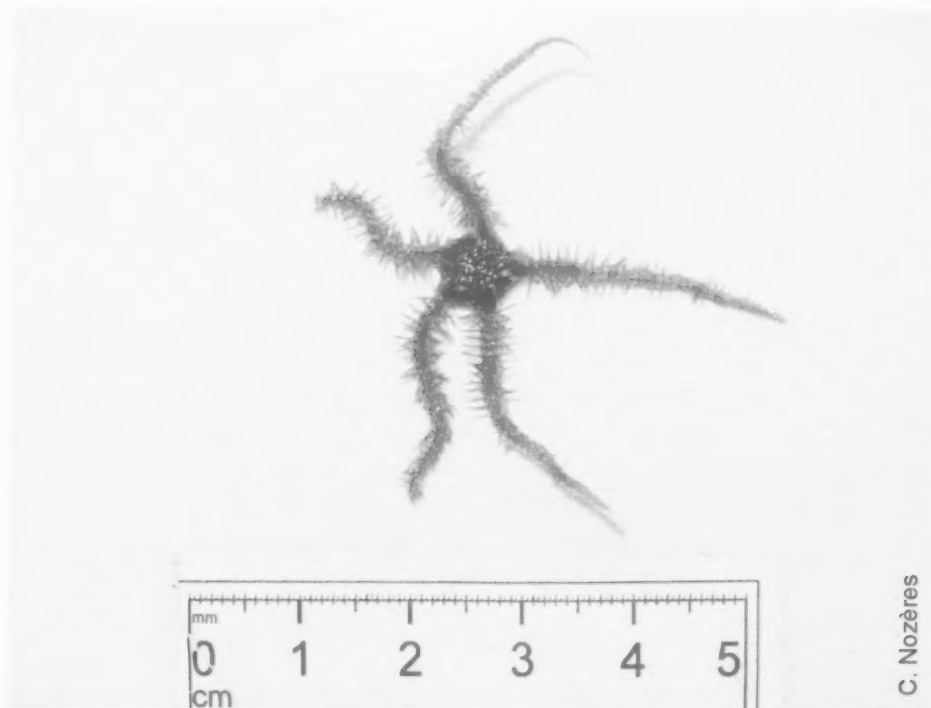
C. Nozères

Echinodermata - Ophiuroidea

Ophiacantha bidentata (Bruzellius, 1805)

AphiaID: 124978 MPO-QC: 8575 Photos: 2006-2013

mistaken for *Ophiopholis aculeata*



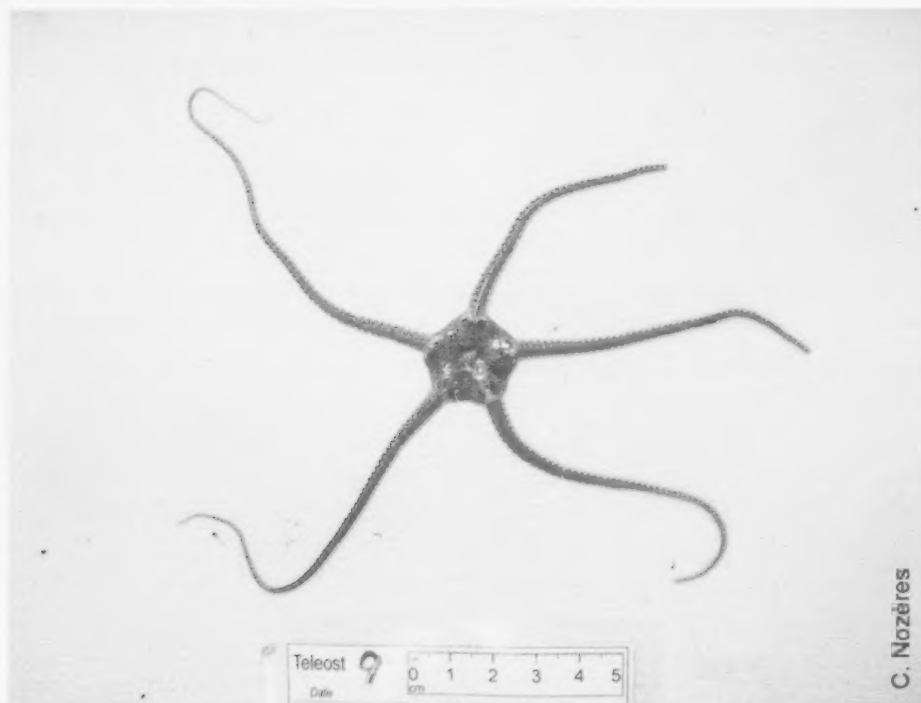
Echinodermata - Ophiuroidea

Ophiura sarsii Lütken, 1855

AphiaID: 124934 MPO-QC: 8553

Photos: 2006-2013

mistaken for *Amphiura* sp.



Echinodermata - Ophiuroidea

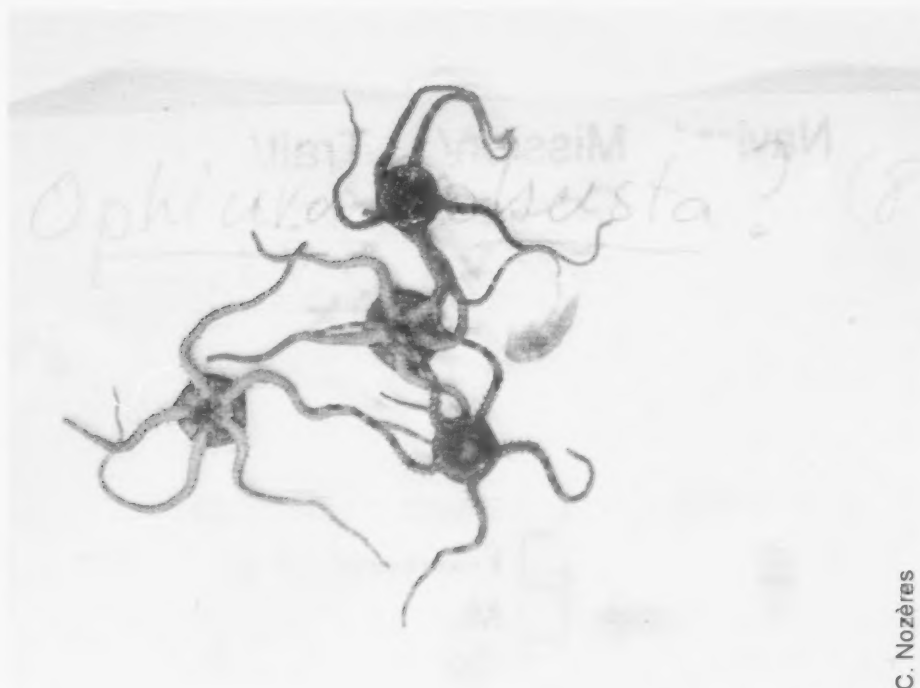
Ophiura robusta (Ayres, 1854)

AphiaID: 124933

MPO-QC: 8552

Photos: 2009, 2011, 2013

rare capture



C. Nozères

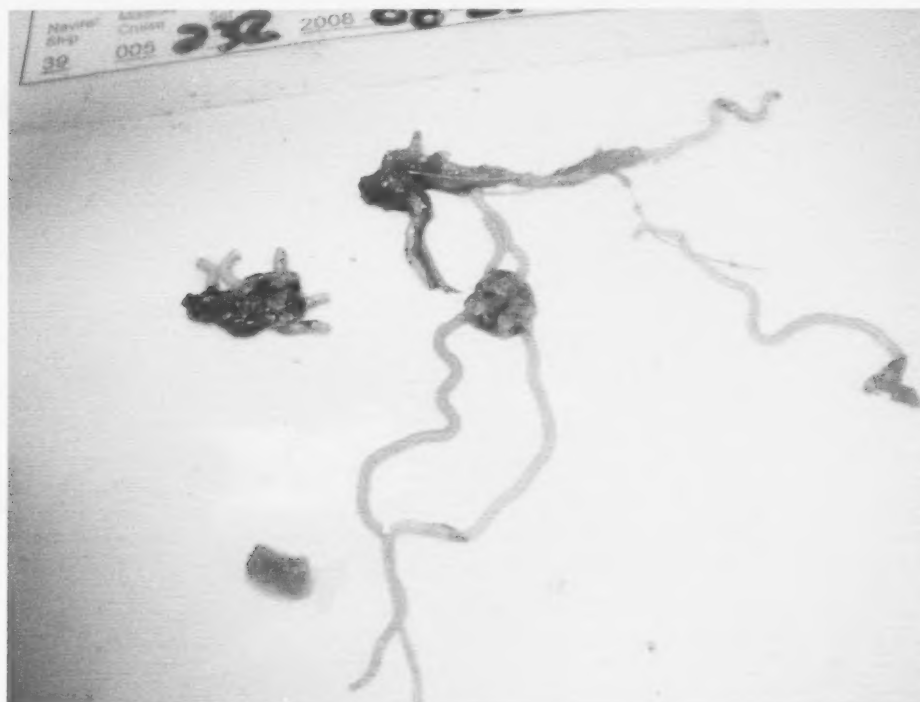


C. Nozères

Echinodermata - Ophiuroidea

***Amphiura* sp.** Forbes, 1843

AphiaID: 123613 MPO-QC: 8593 Photos: 2008, 2009, 2011-2013
mistaken for *Ophiacantha bidentata*, *Ophiura sarsii*



C. Nozères

Echinodermata - Ophiuroidea

Ophioscolex glacialis Müller & Troschel, 1842

AphiaID: 125147 MPO-QC: 8585 Photos: 2007, 2011, 2013
rare capture

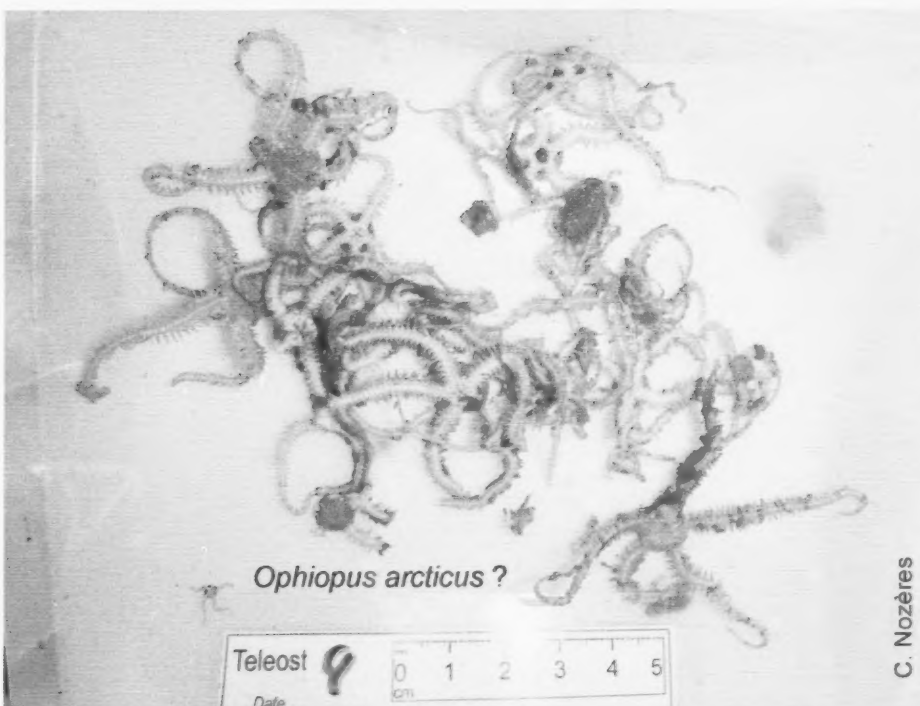
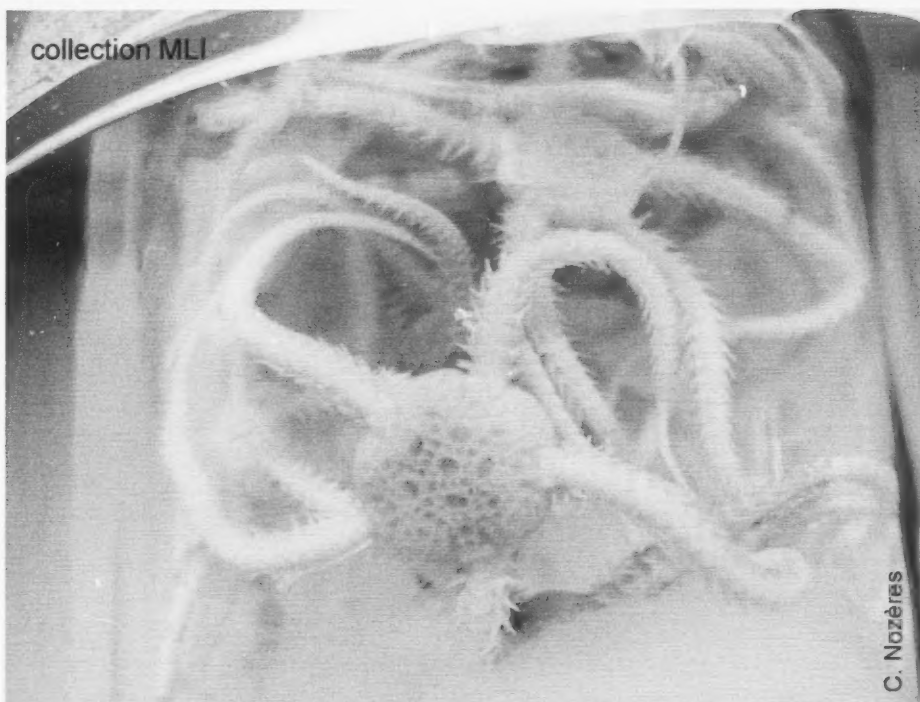


M. Bourque

Echinodermata - Ophiuroidea

Ophiopus arcticus Ljungman, 1867 (to verify)

AphiaID: 125126 MPO-QC: 8584 Photos: 2006-2013
mistaken for *Ophiopholis aculeata*

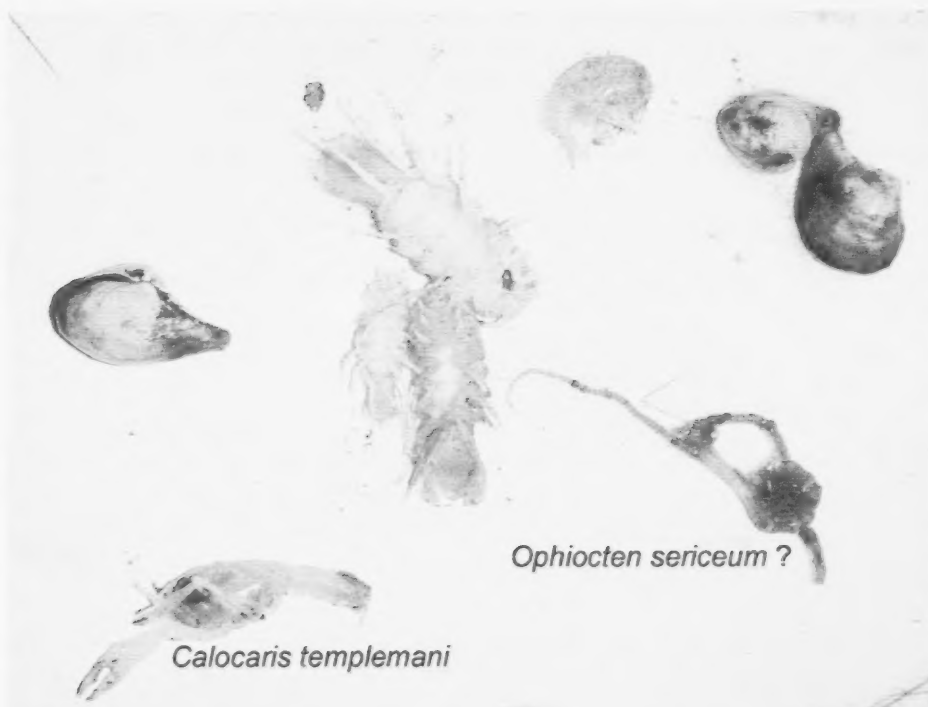


Echinodermata - Ophiuroidea

Ophiecten sericeum (Forbes, 1852) (to verify)

AphiaID: 124860 MPO-QC: 8554 Photos: 2012

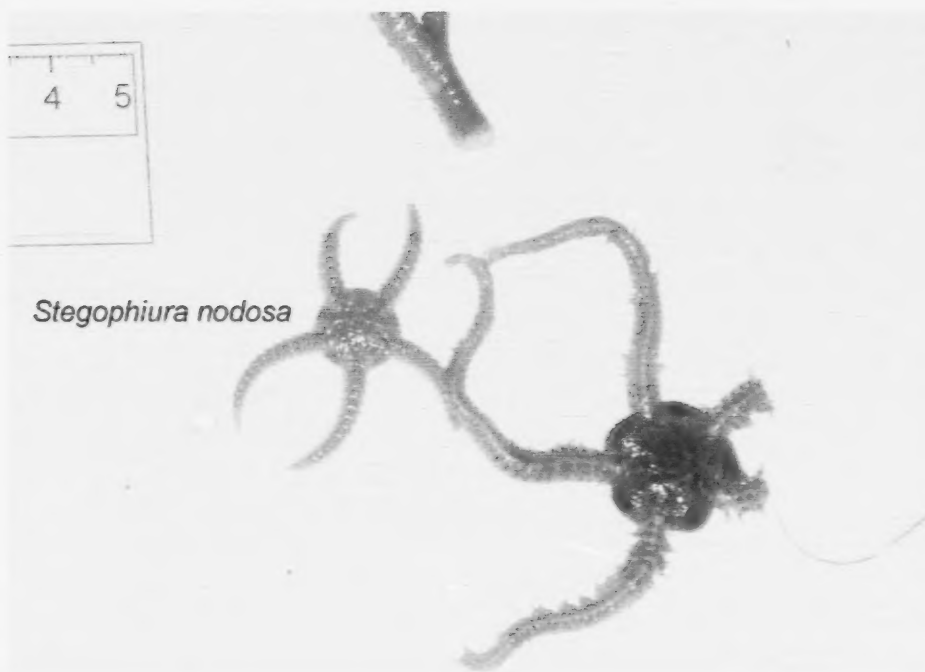
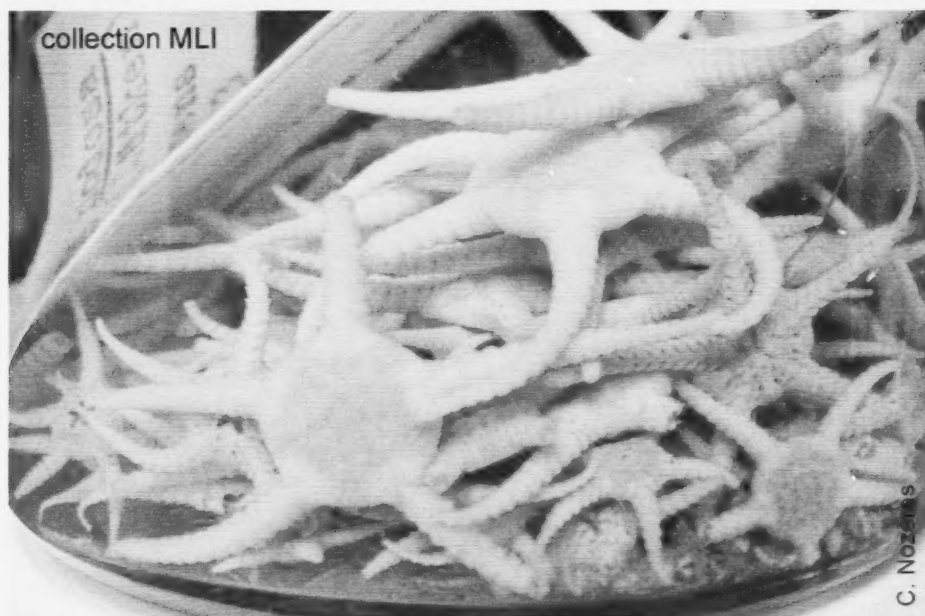
mistaken for *Ophiura sarsii*



Echinodermata - Ophiuroidea

Stegophiura nodosa (Lütken, 1855)

AphiaID: 124943 MPO-QC: 8570 Photos: 2012
mistaken for *Ophiura sarsii*

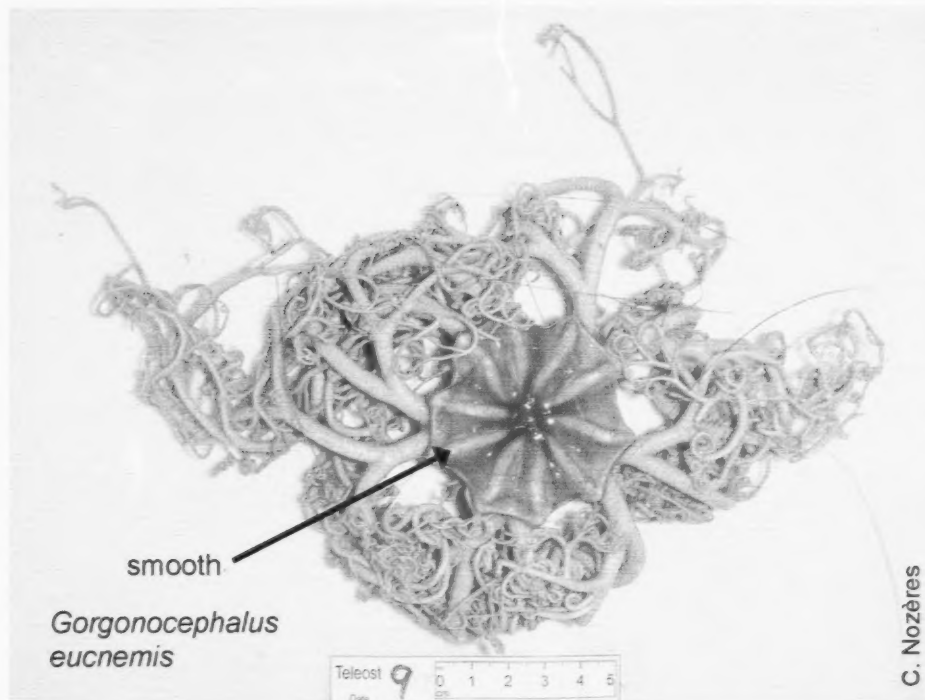
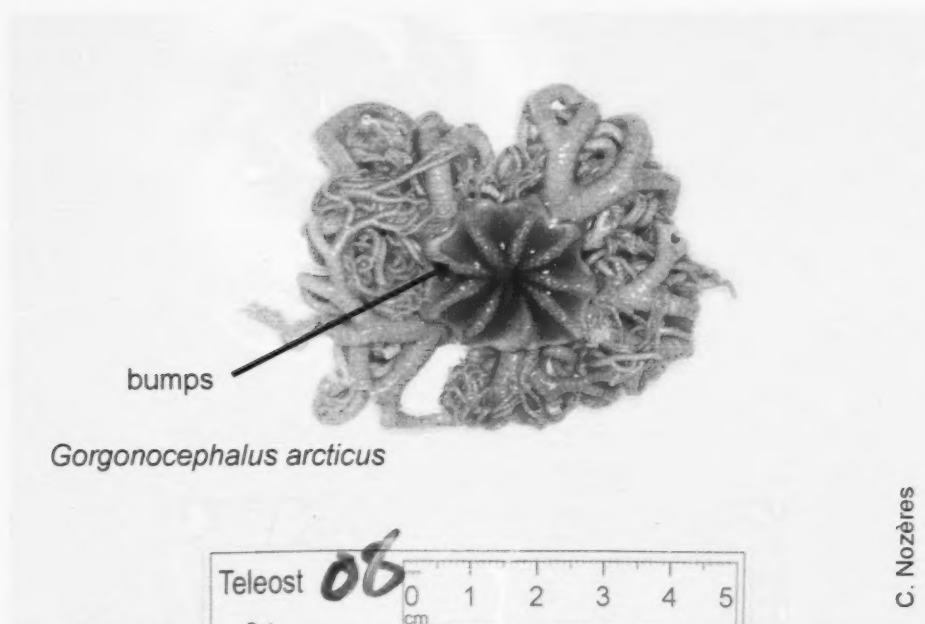


Echinodermata - Ophiuroidea

***Gorgonocephalus* sp. Leach, 1815**

AphialID: 123586 MPO-QC: 8540 Photos: 2006-2013

species: *G. arcticus*, *G. eucnemis*



Echinodermata - Echinoidea

Brisaster fragilis (Düben & Koren, 1844)

AphiaID: 124404 MPO-QC: 8378 Photos: 2006-2013

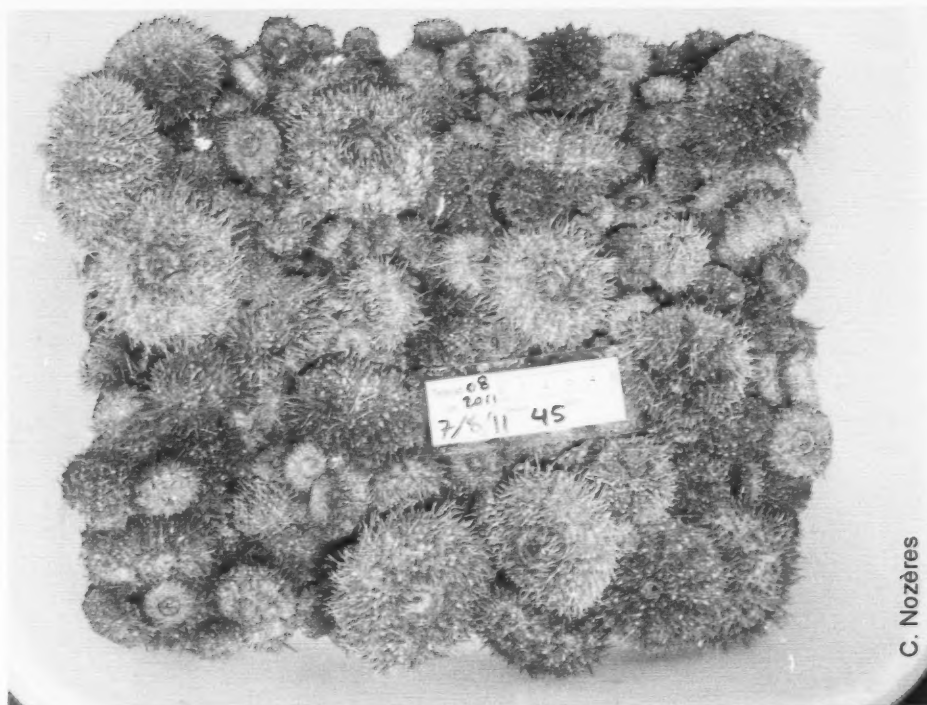
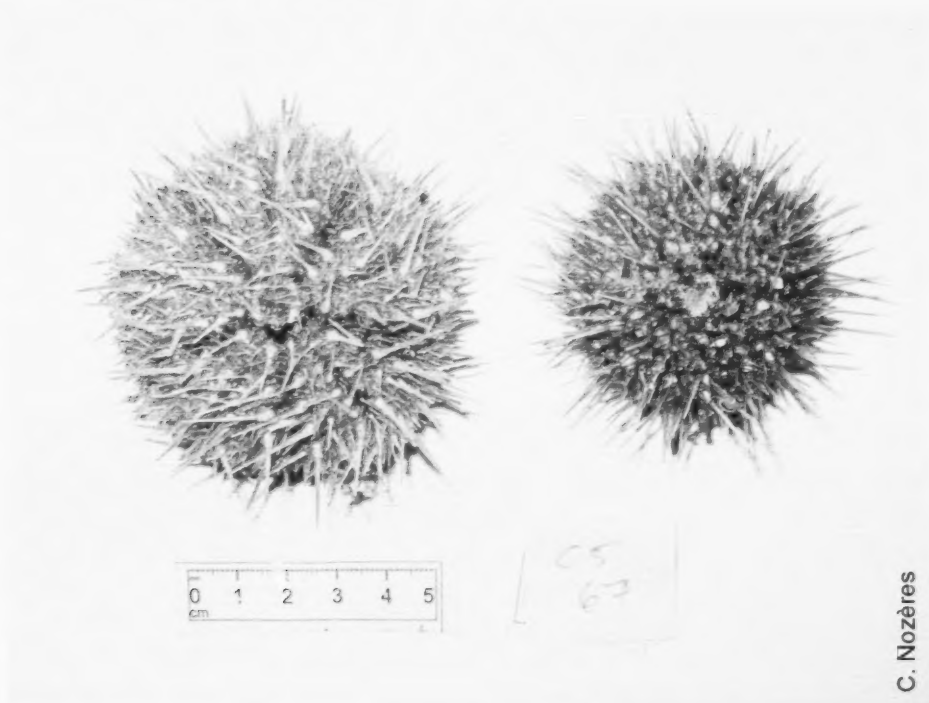


Echinodermata - Echinoidea

***Strongylocentrotus* sp.** Brandt, 1835

AphiaID: 123390 MPO-QC: 8363 Photos: 2006-2013

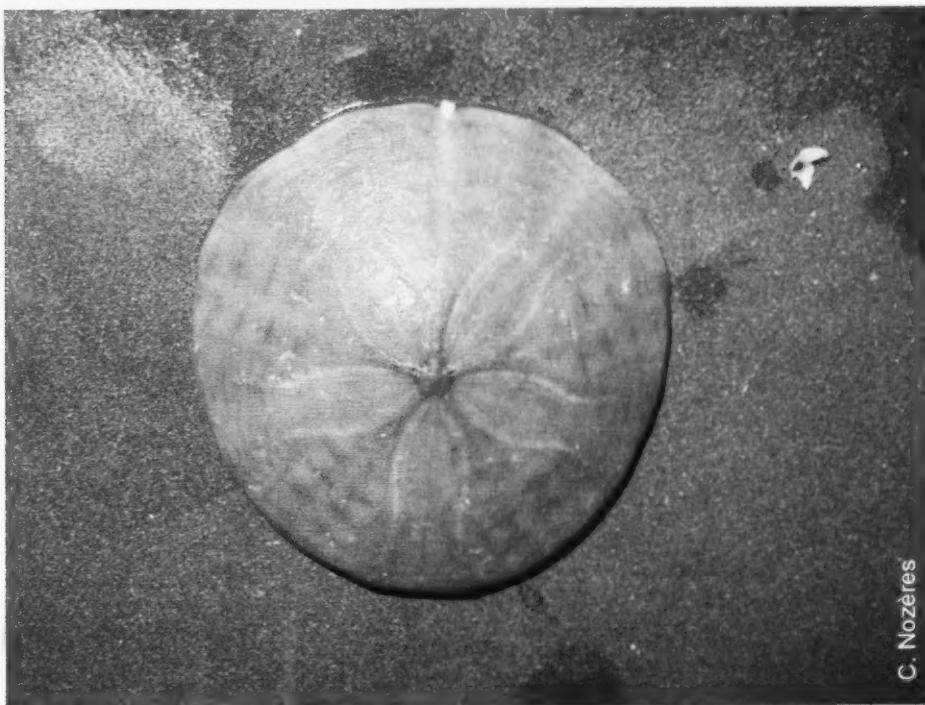
species: *S. droebachiensis*, *S. pallidus*



Echinodermata - Echinoidea

Echinarachnius parma (Lamarck, 1816)

AphiaID: 158062 MPO-QC: 8373 Photos: 2007-2010, 2013



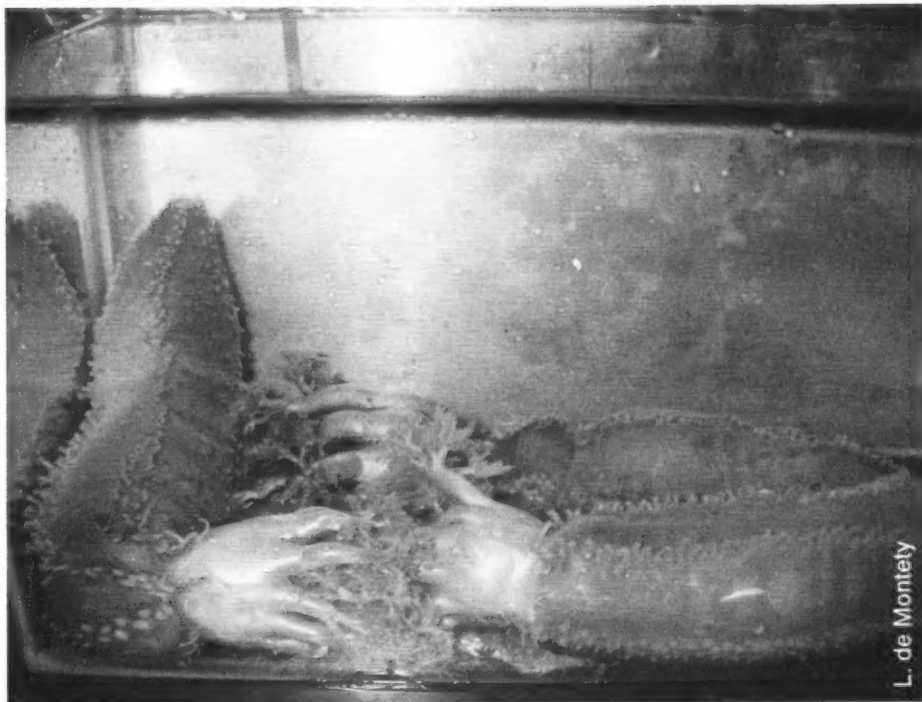
MPO-Institut Maurice Lamontagne
CCGS/NGCC Teleost

Navire/ Ship	Mission/ Cruise	Trait/ Set	Date	Note:
<u>39</u>	<u>006</u>	<u>68</u>	<u>2009-08-10</u>	<u>47</u>

Echinodermata - Holothuroidea

Cucumaria frondosa (Gunnerus, 1767)

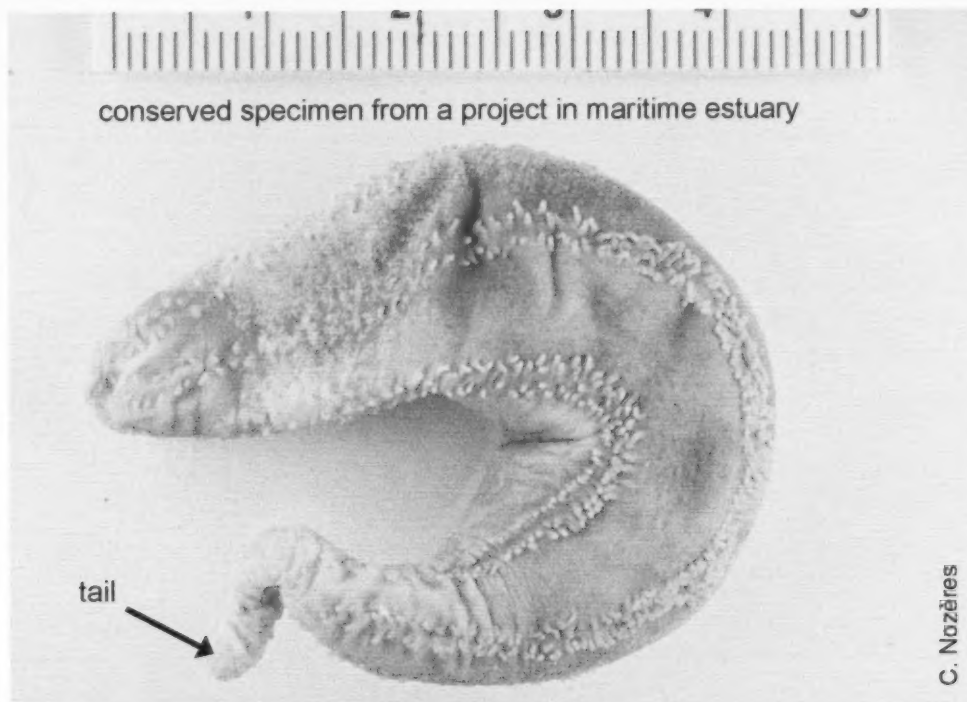
AphiaID: 124612 MPO-QC: 8312 Photos: 2006-2013



Echinodermata - Holothuroidea

Pentamera calcigera (Stimpson, 1851) (to verify)

AphiaID: 124655 MPO-QC: 8319 Photos: 2008

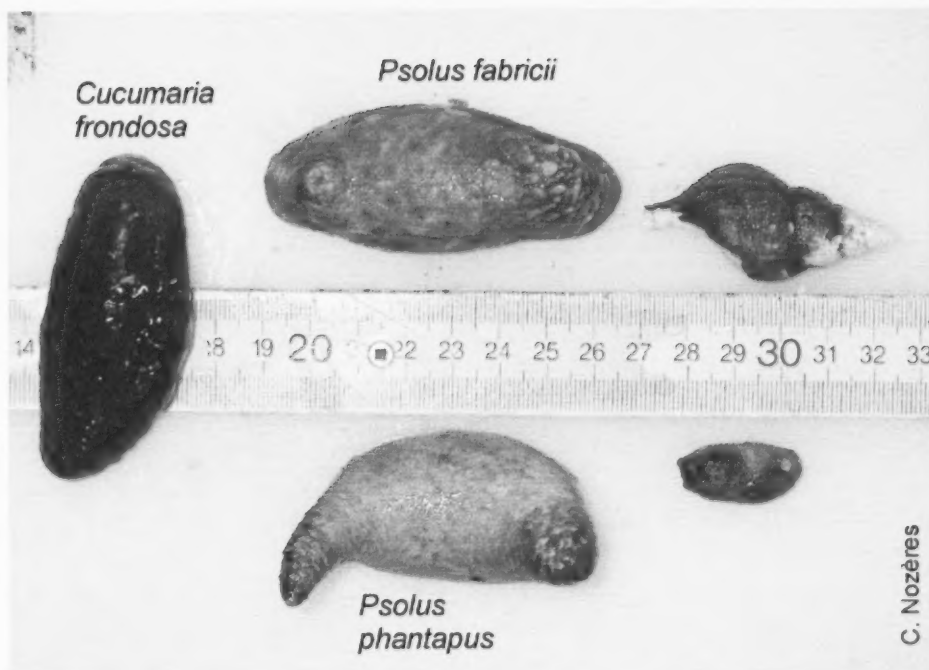
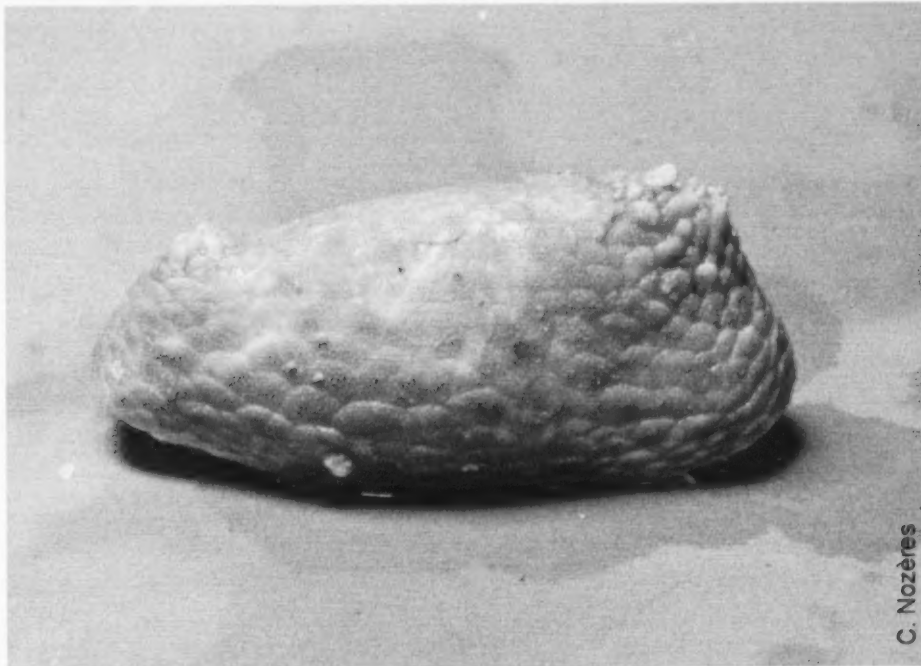


Echinodermata - Holothuroidea

Psolus fabricii (Düben & Koren, 1846)

AphiaID: 124703 MPO-QC: 8295 Photos: 2006, 2013

mistaken for *Psolus phantapus*



Echinodermata - Holothuroidea

Psolus phantapus (Strussenfeldt, 1765)

AphiaID: 124710 MPO-QC: 8294 Photos: 2006-2013

mistaken for *Psolus fabricii*



Echinodermata - Holothuroidea

Molpadia oolitica (Pourtalès, 1851)

AphiaID: 124802 MPO-QC: 8322 Photos: 2006-2012



Echinodermata - Holothuroidea

Holothuroidea

AphiaID: 123083

MPO-QC: 8290

Photos: 2008, 2013



C. Nozères



C. Nozères

MPO-Institut Maurice Lamontagne
CCGS/NGCC Teleost



Echinodermata - Crinoidea

Heliometra glacialis (Owen, 1833 ex Leach MS)

AphiaID: 124223 MPO-QC: 8263 Photos: 2009-2013



Appendix 3. Mollusca

Examples in images, with their taxonomic names, WoRMS code (AphiaID), DFO-Quebec regional code (MPO-QC), and years in which they were seen (Photos). The order of images is selected to compare similar species, first with common taxa, followed by rare captures.

List of taxa (alphabetical by subgroup)

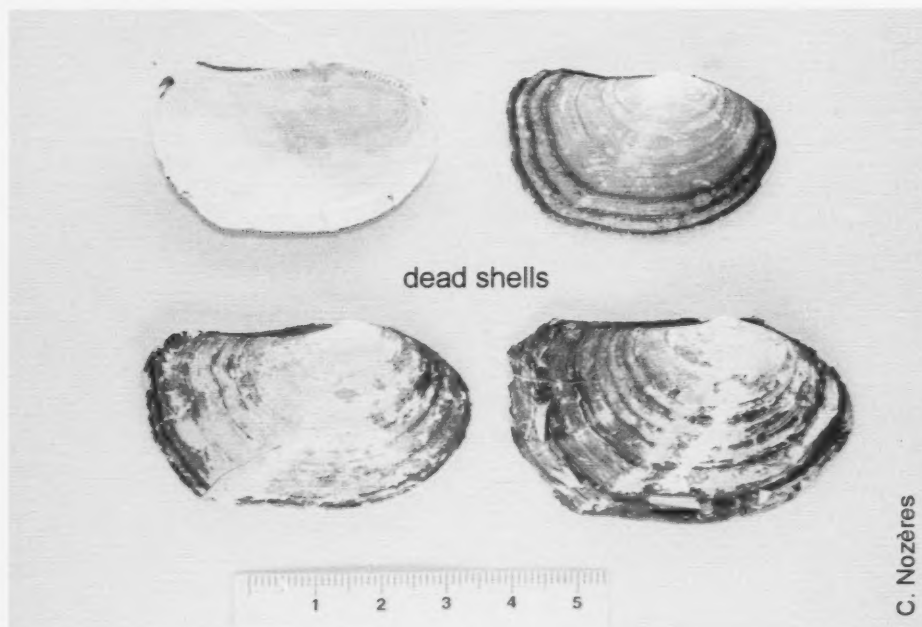
Class	Order	Name
Bivalvia		<i>Anomia</i> sp.
		<i>Astarte</i> sp.
		<i>Astarte borealis</i>
		<i>Bathyarca</i> sp.
		<i>Chlamys islandica</i>
		<i>Ciliatocardium ciliatum ciliatum</i>
		<i>Crenella faba</i>
		<i>Cuspidaria</i> sp.
		<i>Cyclocardia borealis</i>
		<i>Elliptio complanata</i>
		<i>Hiatella arctica</i>
		<i>Macoma calcarea</i>
		<i>Megayoldia thraciaeformis</i>
		<i>Mesodesma</i> sp.
		<i>Musculus</i> sp.
		<i>Mya truncata</i>
		<i>Mytilus</i> sp.
		<i>Nuculana</i> sp.
		<i>Panomya norvegica</i>
		<i>Serripes groenlandicus</i>
		<i>Similipecten greenlandicus</i>
		<i>Yoldia</i> sp.
		<i>Teredo navalis</i>
Gastropoda		<i>Arrhoges occidentalis</i>
		<i>Ariadnaria borealis</i>
		<i>Aulacofusus brevicauda</i>
		<i>Beringius turtoni</i>
		<i>Boreotrophon clathratus</i>
		<i>Boreotrophon truncatus</i>
		<i>Buccinum</i> sp.
		<i>Buccinum scalariforme</i>
		<i>Buccinum undatum</i>
		<i>Colus pubescens</i>
		<i>Colus stimpsoni</i>
		<i>Cryptonatica affinis</i>
		<i>Lacuna vineta</i>
		<i>Limneria undata</i>
		<i>Littorina littorea</i>
		<i>Lunatia pallida</i>

		<i>Margarites costalis</i>
		<i>Margarites groenlandicus</i>
		<i>Neptunea decemcostata</i>
		<i>Neptunea despecta</i>
		<i>Onchidiopsis</i> sp.
		<i>Plicifusus kroeyeri</i>
		<i>Solariella</i> sp.
		<i>Scabrotrophon fabricii</i>
		<i>Scaphander punctostriatus</i>
		<i>Tachyrhynchus erosus</i>
		<i>Velutina velutina</i>
		<i>Volutopsius norvegicus</i>
	Nudibranchia	<i>Colga villosa</i>
		<i>Dendronotus</i> sp.
		<i>Doridoxa ingolfiana</i>
Polyplacophora		<i>Amicula vestita</i>
		<i>Stenosemus albus</i>
		<i>Stenosemus exaratus</i>
		<i>Tonicella</i> sp.
Cephalopoda	Teuthida	<i>Illex illecebrosus</i>
		<i>Gonatus fabricii</i>
	Sepiolida	<i>Rossia</i> sp
	Octopoda	<i>Bathypolypus bairdii</i>
		<i>Stauroteuthis syrtensis</i>

Mollusca - Bivalvia

Megayoldia thraciaeformis (Storer, 1838)

AphiaID: 141983 MPO-QC: 4025 Photos: 2007-2013



Mollusca - Bivalvia

***Nuculana* sp.** Link, 1807

AphiaID: 138259 MPO-QC: 4019

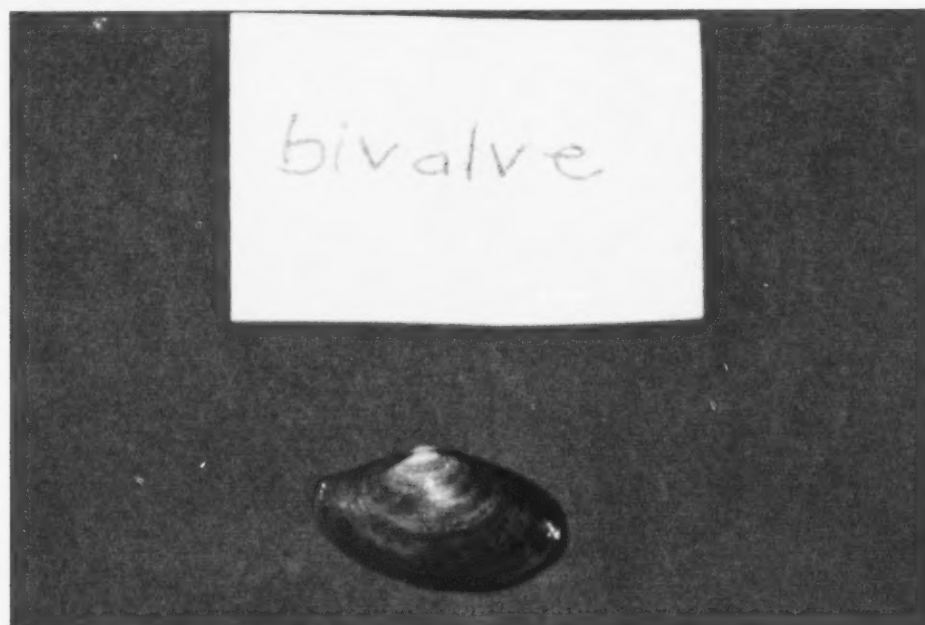
Photos: 2008, 2009, 2011, 2013



***Yoldia* sp.** Möller, 1842

AphiaID: 138672 MPO-QC: 4074

Photos: 2006



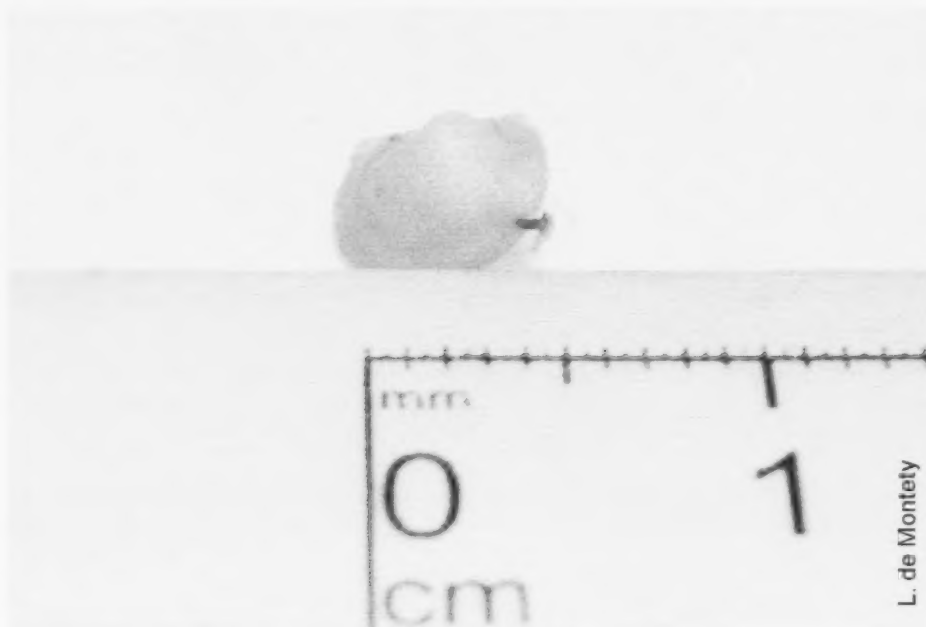
Mollusca - Bivalvia

***Bathyarca* sp.** Kobelt 1891

AphiaID: 137673

MPO-QC: 4102

Photos: 2009

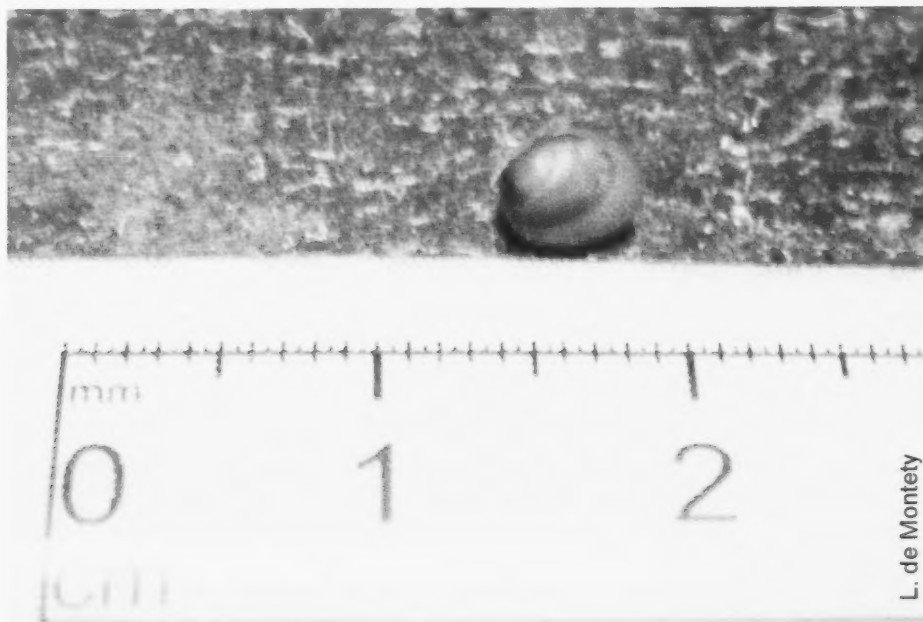


Crenella faba (O. F. Müller, 1776)

AphiaID: 156763

MPO-QC: 4124

Photos: 2009



Mollusca - Bivalvia

***Musculus* sp.** (Röding, 1798)

AphiaID: 138225

MPO-QC: 4126

Photos: 2008, 2011, 2012



Mollusca - Bivalvia

***Mytilus* sp.** Linnaeus, 1758

AphiaID: 138228 MPO-QC: 4121

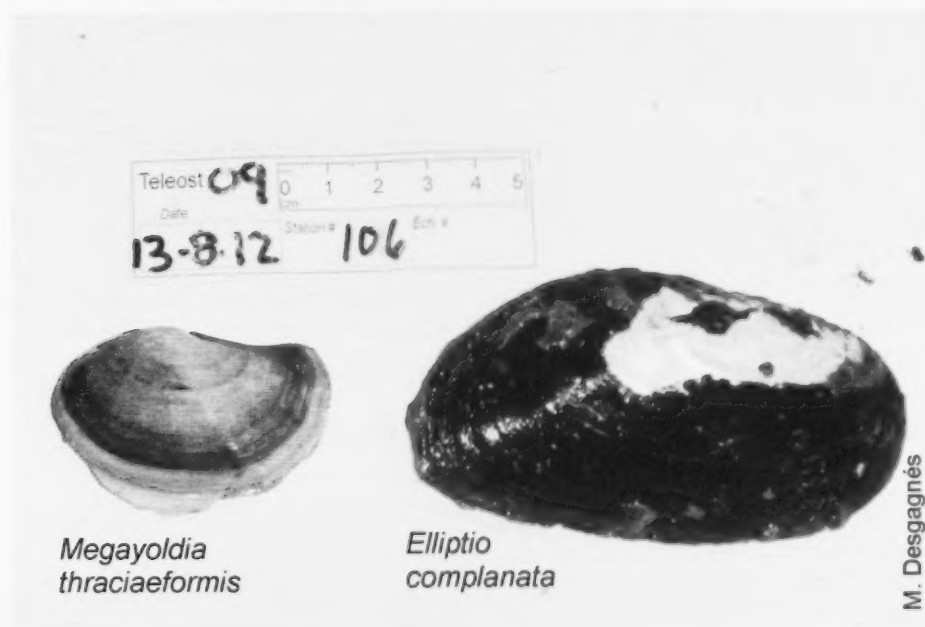
Photos: 2006-2013



Elliptio complanata (Lightfoot, 1786)

AphiaID: 160340 MPO-QC: n.a. Photos: 2008, 2009, 2011, 2012

empty shells of a freshwater mussel; not to be recorded in capture



Mollusca - Bivalvia

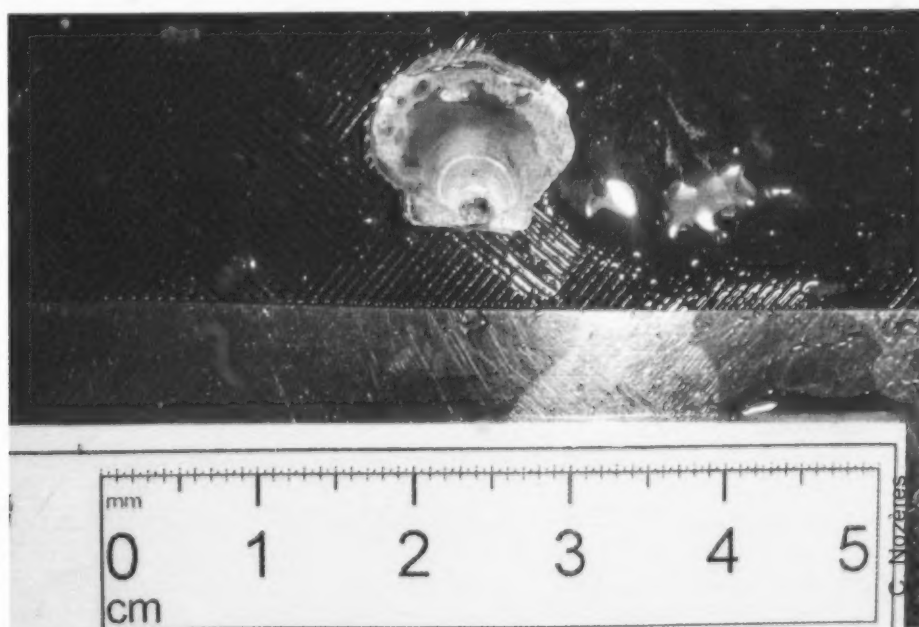
Chlamys islandica (O. F. Müller, 1776)

AphiaID: 140692 MPO-QC: 4167 Photos: 2006-2013



Similipecten greenlandicus (G. B. Sowerby II, 1842)

AphiaID: 181299 MPO-QC: 4191 Photos: 2008, 2009, 2011-2013
mistaken for *Placopecten magellanicus*



Mollusca - Bivalvia

***Anomia* sp.** Linnaeus, 1758

AphiaID: 137650 MPO-QC: 4219

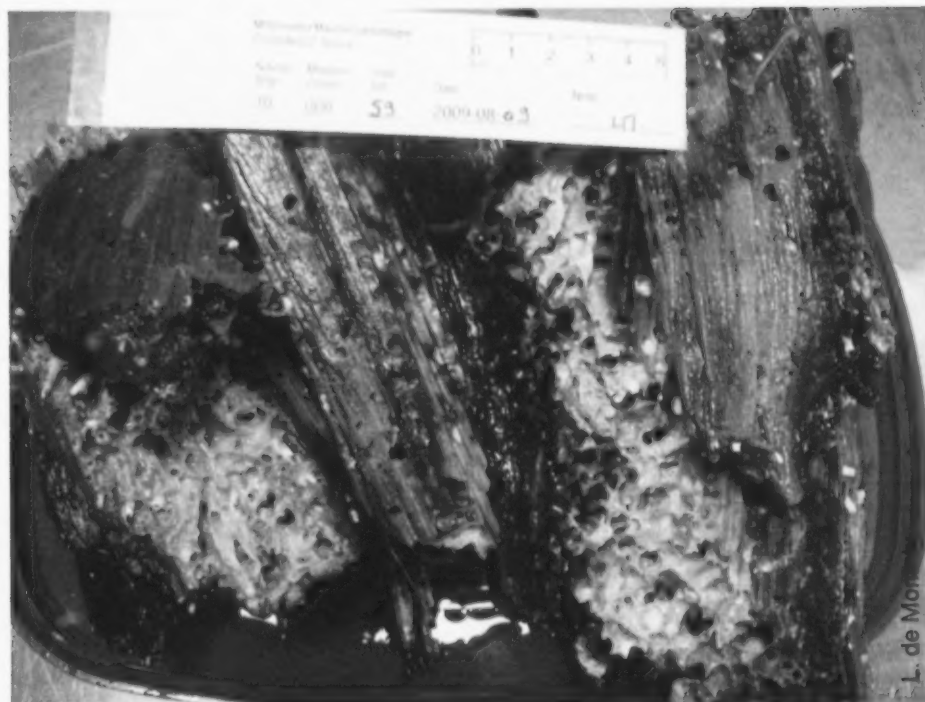
Photos: 2008, 2009, 2012, 2013



Mollusca - Bivalvia

Teredo navalis Linnaeus, 1758

AphiaID: 141607 MPO-QC: 4498 Photos: 2009



Mollusca - Bivalvia

***Astarte* sp.** Sowerby, 1816

AphiaID: 137683 MPO-QC: 4227

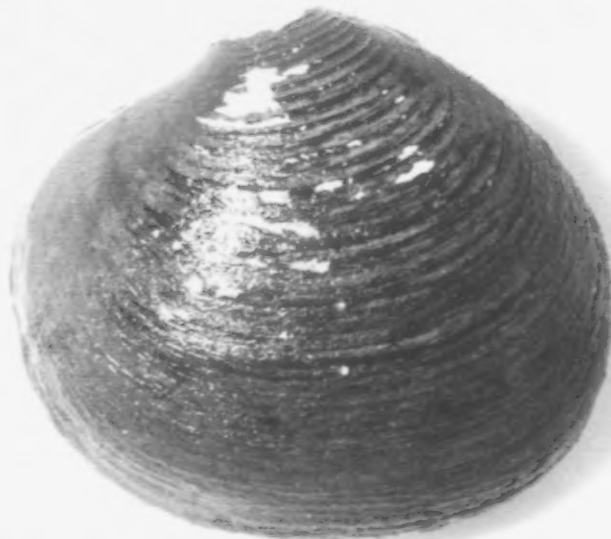
Photos: 2006-2013



Astarte borealis (Schumacher, 1817)

AphiaID: 138818 MPO-QC: 4231

Photos: 2008

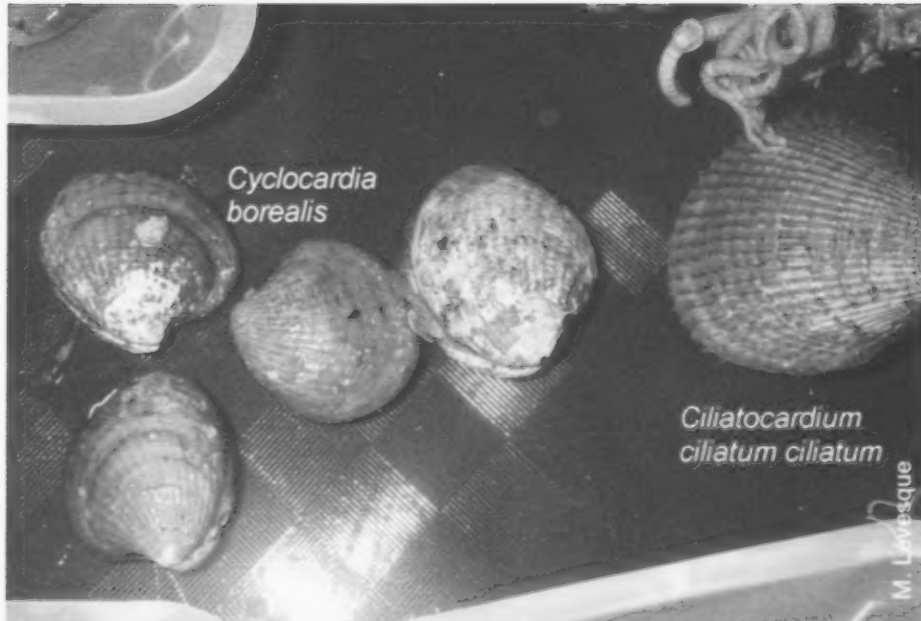


Mollusca - Bivalvia

Cyclocardia borealis (Conrad, 1832)

AphiaID: 156832 MPO-QC: 4268 Photos: 2007-2012

mistaken for *Astarte* sp., *Ciliatocardium ciliatum ciliatum*



Mollusca - Bivalvia

Ciliatocardium ciliatum ciliatum (Fabricius, 1780)

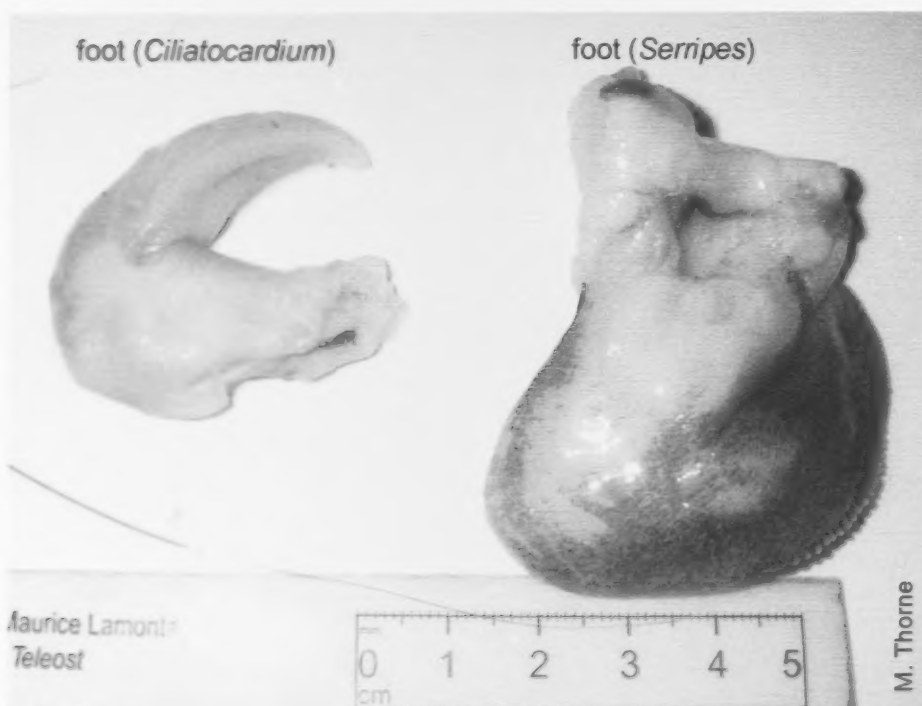
AphiaID: 381904 MPO-QC: 4351 Photos: 2006-2013



Mollusca - Bivalvia

Serripes groenlandicus (Mohr, 1786)

AphiaID: 582749 MPO-QC: 4352 Photos: 2008-2013



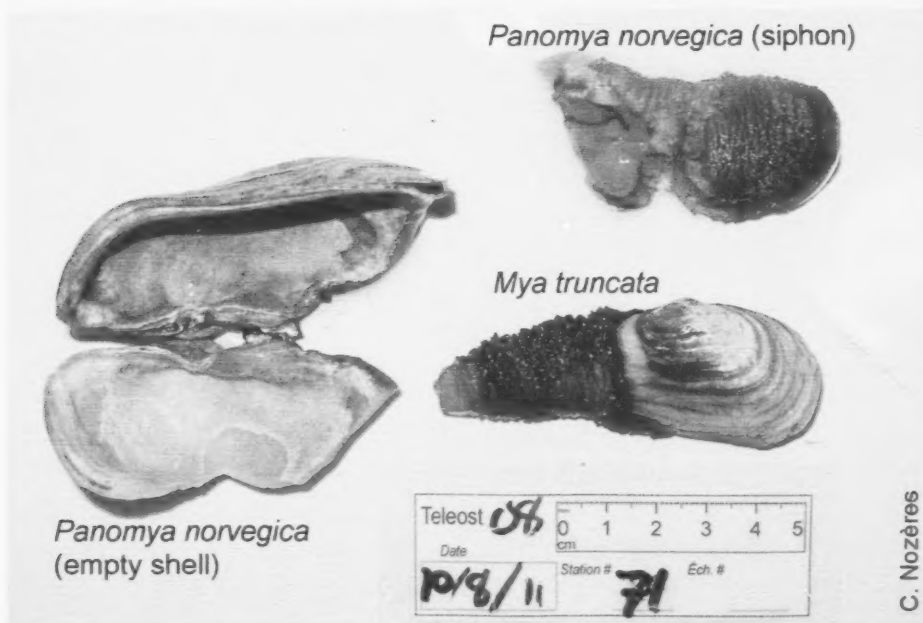
Mollusca - Bivalvia

Mya truncata Linnaeus, 1758

AphiaID: 140431 MPO-QC: 4428

Photos: 2011

mistaken for *Panomya norvegica*



Panomya norvegica (Spengler, 1793)

AphiaID: 140105 MPO-QC: 4438

Photos: 2007-2011, 2013

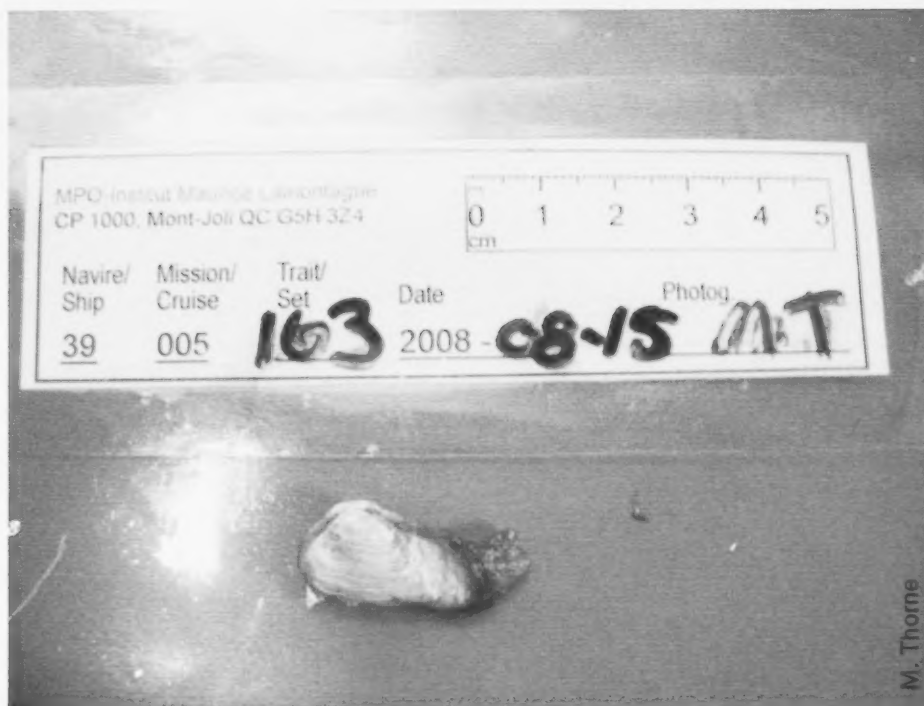


Mollusca - Bivalvia

Hiatella arctica (Linnaeus, 1767)

AphiaID: 140103 MPO-QC: 4437 Photos: 2007-2011

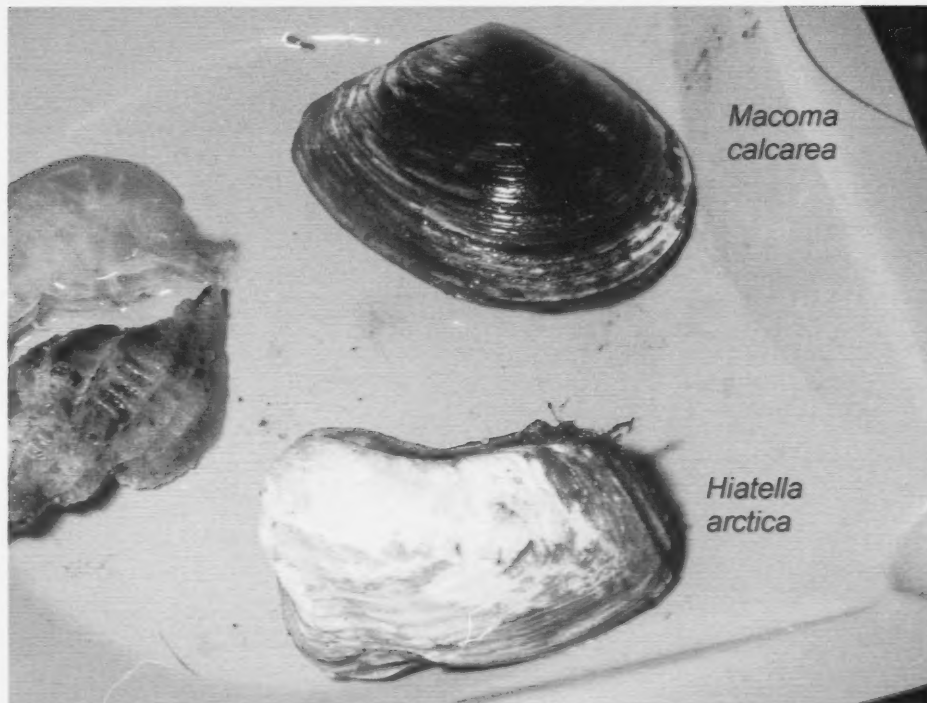
mistaken for *Mya truncata*, *Panomya norvegica*



Mollusca - Bivalvia

Macoma calcarea (Gmelin, 1791)

AphiaID: 141580 MPO-QC: 4395 Photos: 2007, 2009, 2010



L. de Montety

Mollusca - Bivalvia

***Cuspidaria* sp.** Nardo, 1840

AphiaID: 137858

MPO-QC: 4525

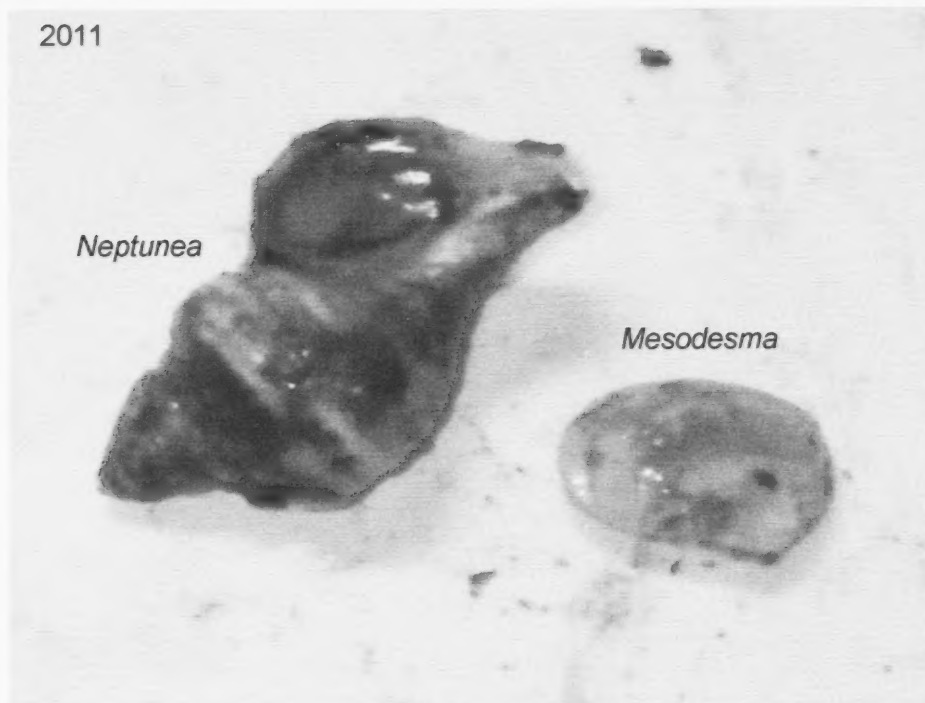
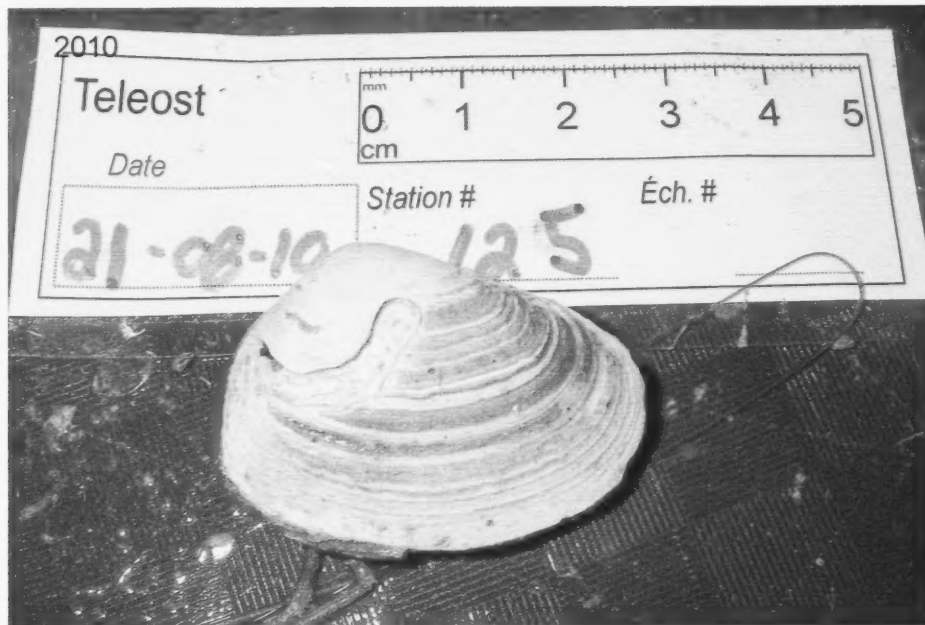
Photos: 2006-2013



Mollusca - Bivalvia

Mesodesma sp. Deshayes, 1831

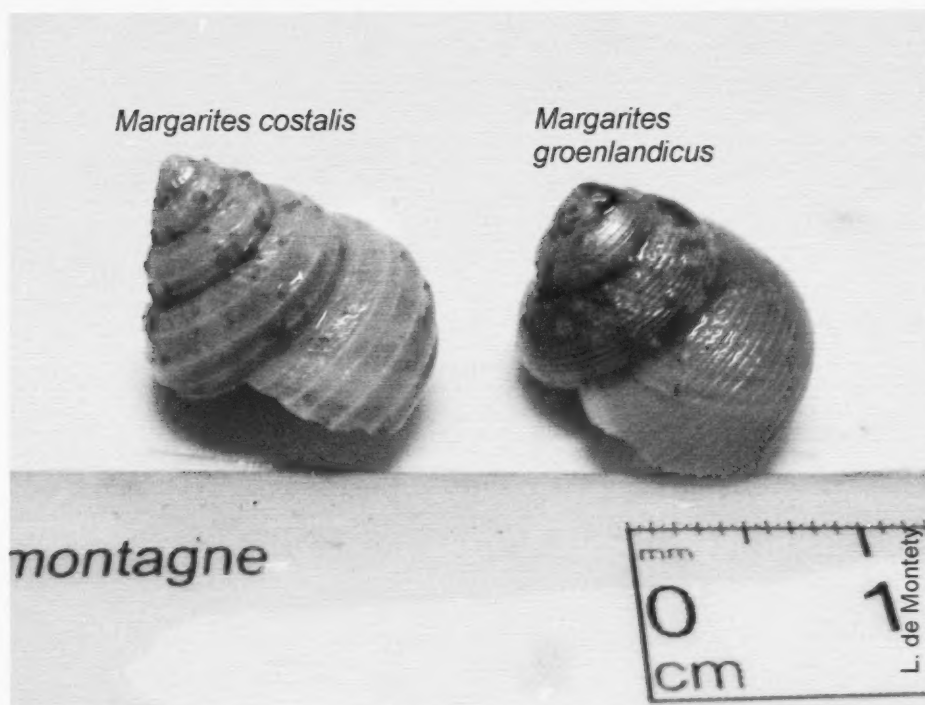
AphiaID: 156804 MPO-QC: 4383 Photos: 2010, 2011, 2013
possibly empty shells



Mollusca - Gastropoda

Margarites costalis (Gould, 1841)

AphiaID: 141819 MPO-QC: 3219 Photos: 2006-2013 (*Margarites* sp.)
mistaken for *Margarites groenlandicus*, *Solariella obscura*

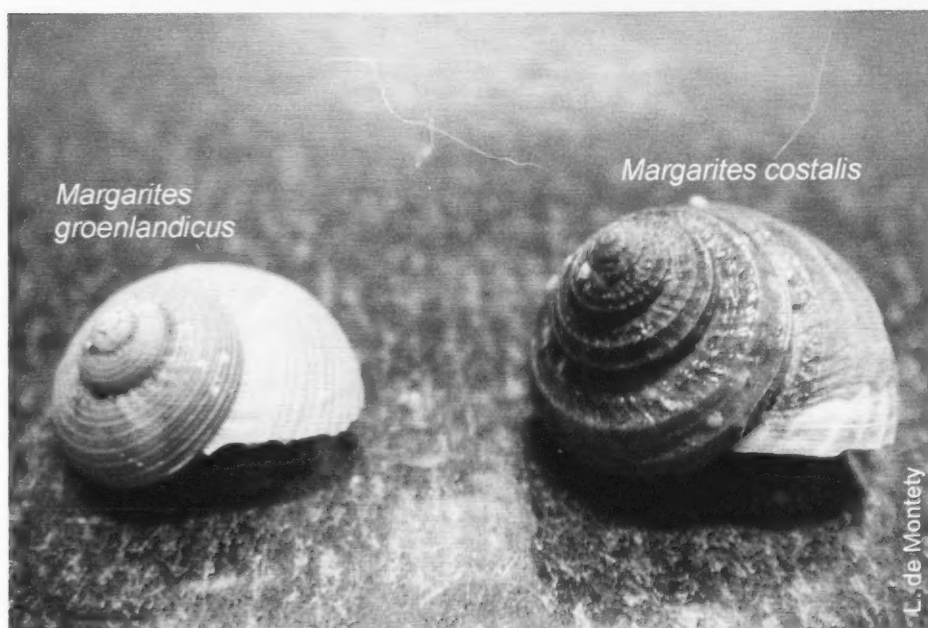


Mollusca - Gastropoda

Margarites groenlandicus (Gmelin, 1791)

AphiaID: 141820 MPO-QC: 3216 Photos: 2006-2013 (*Margarites* sp.)

mistaken for *Margarites costalis*, *Solariella varicosa*



Mollusca - Gastropoda

***Solariella* sp.** S. Wood, 1842

AphiaID: 138597 MPO-QC: 3225

Photos: 2009, 2013



Mollusca - Gastropoda

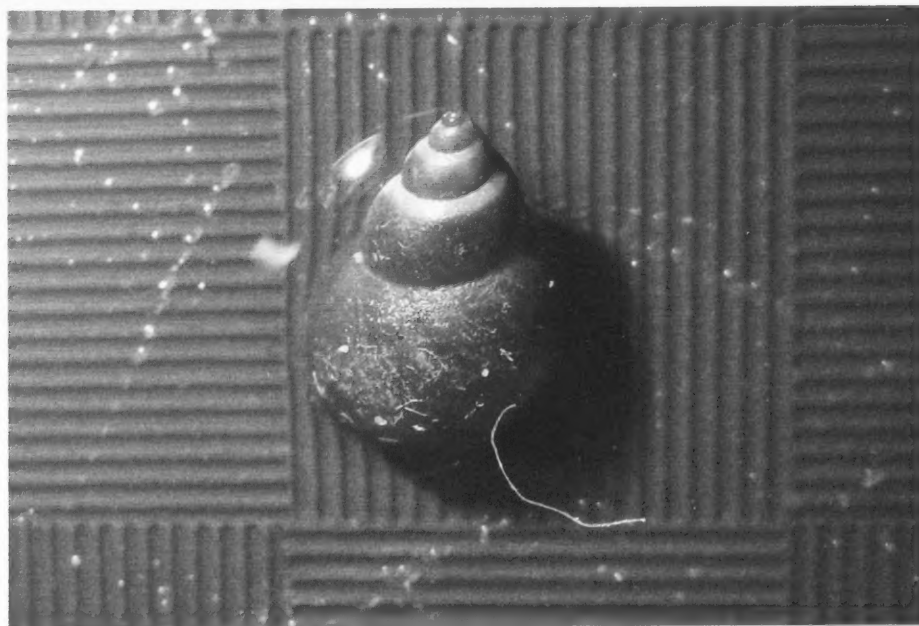
Ariadnaria borealis (Broderip & G. B. Sowerby I, 1829)

AphiaID: 714762 MPO-QC: 3305 Photos: 2013



Lacuna vincta (Montagu, 1803)

AphiaID: 140170 MPO-QC: 3255 Photos: 2008, 2009, 2013



Mollusca - Gastropoda

Littorina littorea (Linnaeus, 1758)

AphiaID: 140262 MPO-QC: 3249 Photos: 2008-2010



Tachyrhynchus erosus (Couthouy, 1838)

AphiaID: 196391 MPO-QC: 3310 Photos: 2009, 2012



Mollusca - Gastropoda

***Arrhoges occidentalis* (Beck, 1836)**

AphiaID: **531617** MPO-QC: **3418** Photos: **2006-2013**

mistaken for *Buccinum* sp., *Colus* sp., and *Plicifusus kroeyeri* when shell lip is broken



Mollusca - Gastropoda

Plicifusus kroeyeri (Möller, 1842)

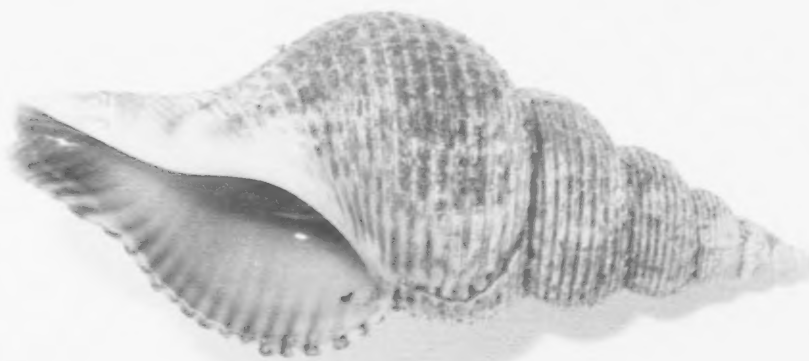
AphiaID: 491269 MPO-QC: 3578 Photos: 2008, 2012, 2013
mistaken for *Arrhoges occidentalis*, *Buccinum* sp., *Colus* sp.



M. Lévesque

Aulacofusus brevicauda (Deshayes, 1832)

AphiaID: 490735 MPO-QC: 3583 Photos: 2007-2009, 2011, 2013
mistaken for *Colus* sp.



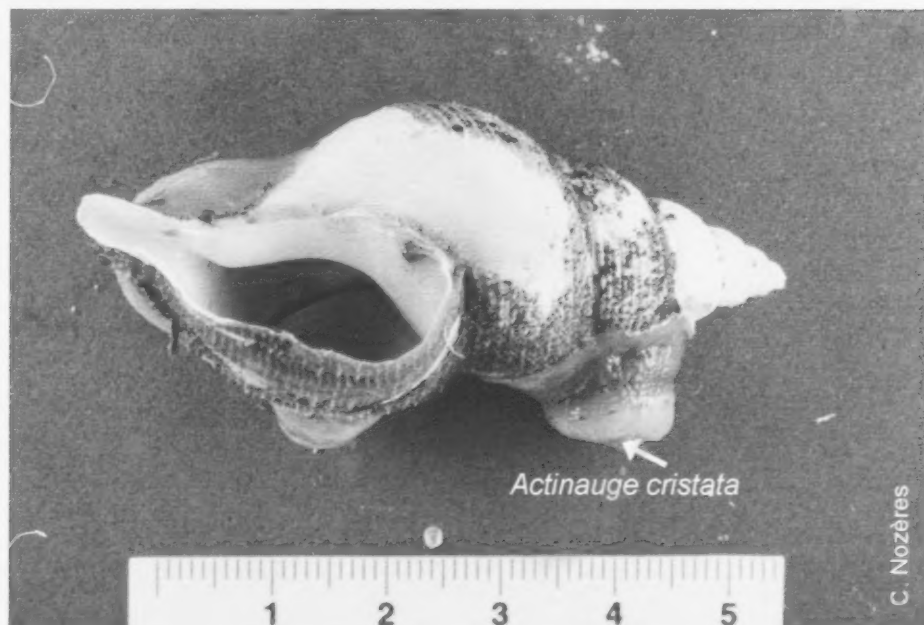
C. Nozères

Mollusca - Gastropoda

Colus pubescens (A. E. Verrill, 1882)

AphiaID: 160212 MPO-QC: 3577 Photos: 2006-2013

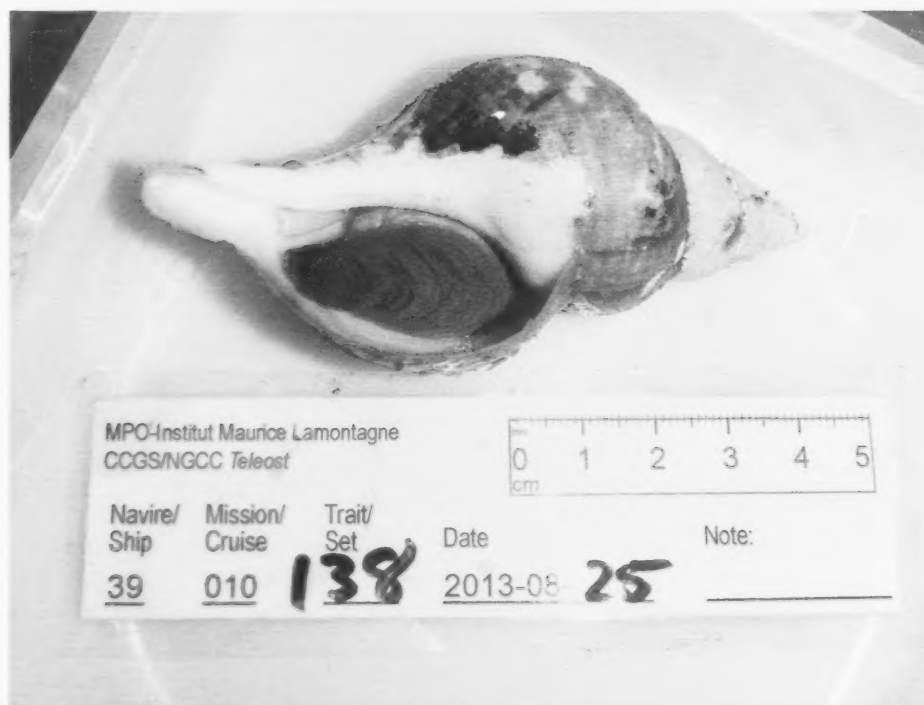
hairy shell, often with anemones attached



Mollusca - Gastropoda

Colus stimpsoni (Mörch, 1868)

AphiaID: 160215 MPO-QC: 3576 Photos: 2006-2013



Mollusca - Gastropoda

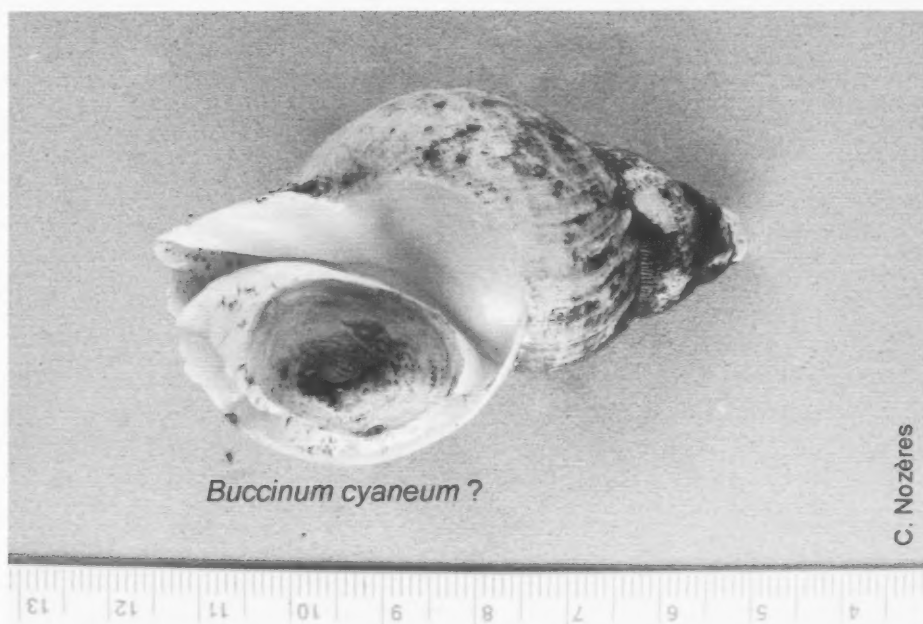
Beringius turtoni Linnaeus, 1758

AphiaID: 138855 MPO-QC: 3519 Photos: 2008, 2012, 2013
mistaken for *Colus* sp., *Volutopsius norvegicus*



***Buccinum* sp.** Linnaeus, 1758

AphiaID: 137701 MPO-QC: 3516 Photos: 2007-2013



Mollusca - Gastropoda

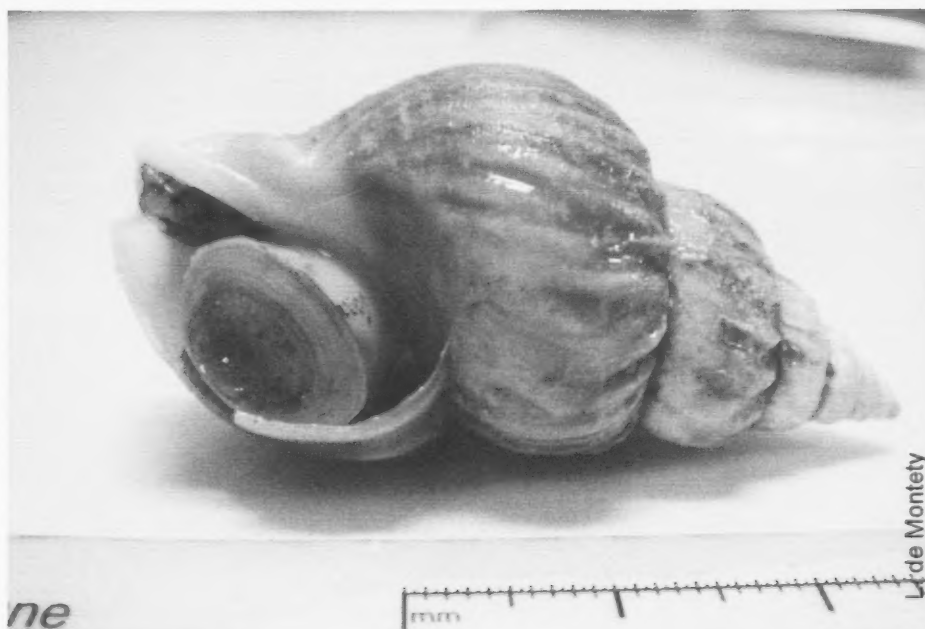
Buccinum undatum Linnaeus, 1758

AphiaID: 138878 MPO-QC: 3517 Photos: 2007-2013



Buccinum scalariforme Møller, 1842

AphiaID: 138875 MPO-QC: 3523 Photos: 2009, 2010, 2013
mistaken for *Buccinum undatum*



Mollusca - Gastropoda

***Neptunea decemcostata* (Say, 1826)**

AphiaID: 491164 MPO-QC: 3566 Photos: 2007-2013 (*Neptunea* sp.)



***Neptunea despecta* (Linnaeus, 1758)**

AphiaID: 138923 MPO-QC: 3567 Photos: 2007-2013 (*Neptunea* sp.)

MPO-Institut Maurice Lamontagne
CP 1000, Mont-Joli QC G5H 3Z4

0 1 2 3 4 5
cm

Navire/
Ship

Mission/
Cruise

Trait/
Set

Date

Photog

39

005

155

2008

08-14

M.T



Mollusca - Gastropoda

Volutopsius norwegicus (Gmelin, 1791)

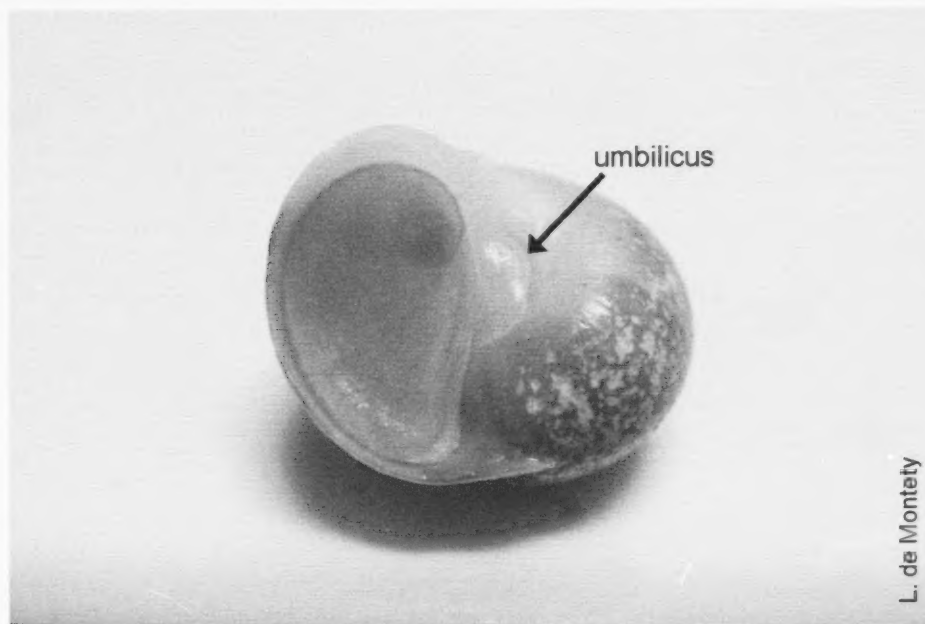
AphiaID: 138938 MPO-QC: 3564 Photos: 2011-2012
mistaken for *Beringius turtoni*, *Colus* sp.



Mollusca - Gastropoda

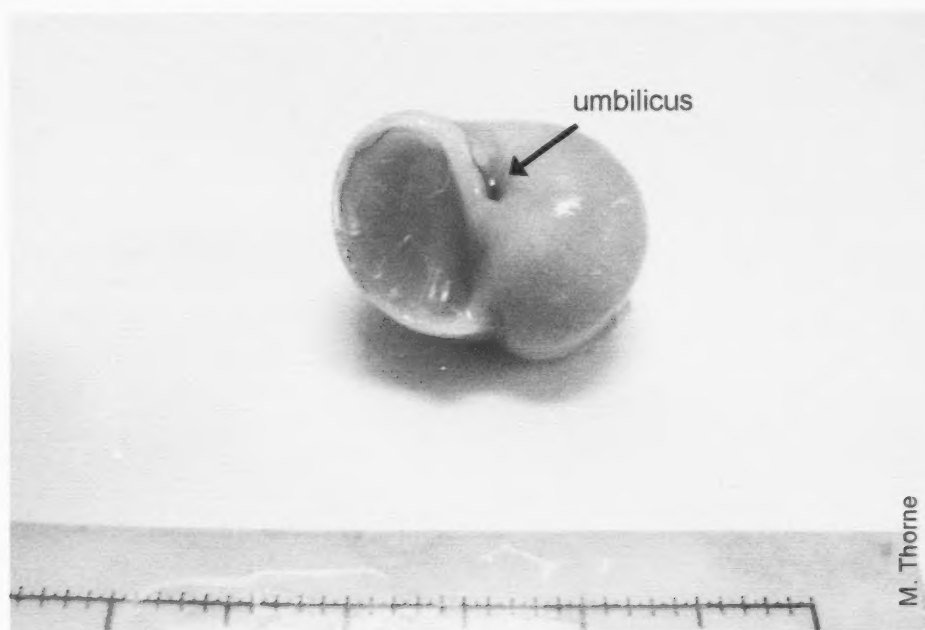
Cryptonatica affinis (Gmelin, 1791)

AphiaID: 140525 MPO-QC: 3422 Photos: 2006-2013 (Naticidae)
mistaken for *Lunatia pallida*, *Lunatia heros* (absent)



Lunatia pallida (Broderip & G. B. Sowerby I, 1829)

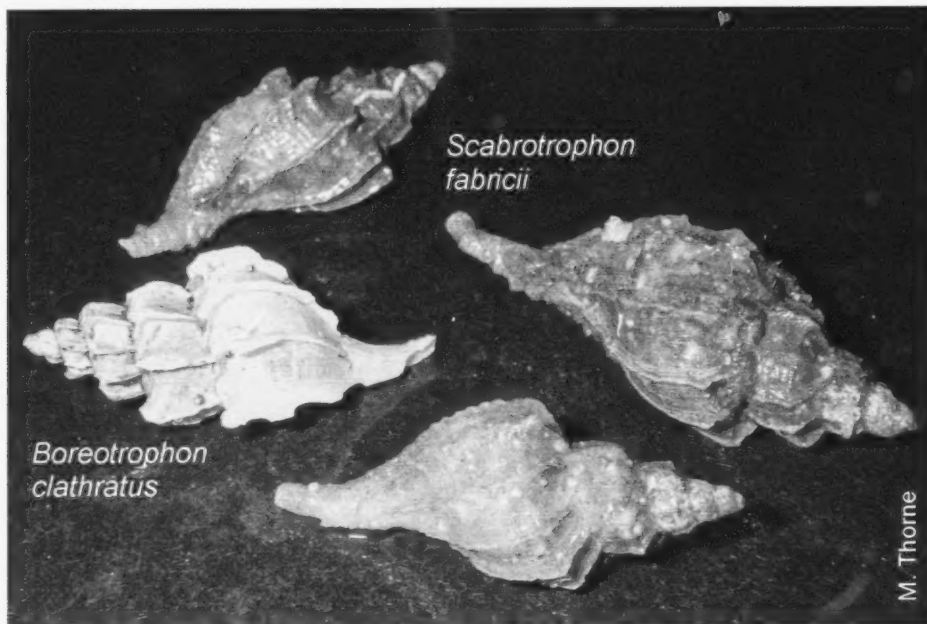
AphiaID: 153850 MPO-QC: 3437 Photos: 2006-2013 (Naticidae)



Mollusca - Gastropoda

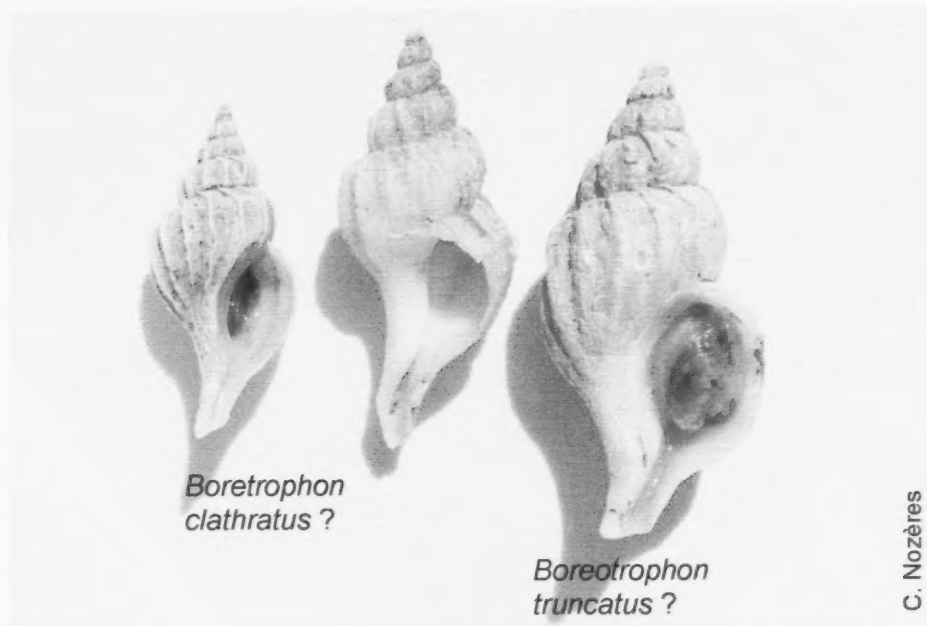
Boreotrophon clathratus (Linnaeus, 1767)

AphiaID: 146732 MPO-QC: 3487 Photos: 2006-2013 (*Boreotrophon* sp.)



Boreotrophon truncatus (Strøm, 1768) (to verify)

AphiaID: 146733 MPO-QC: 3484 Photos: 2006-2013 (*Boreotrophon* sp.)

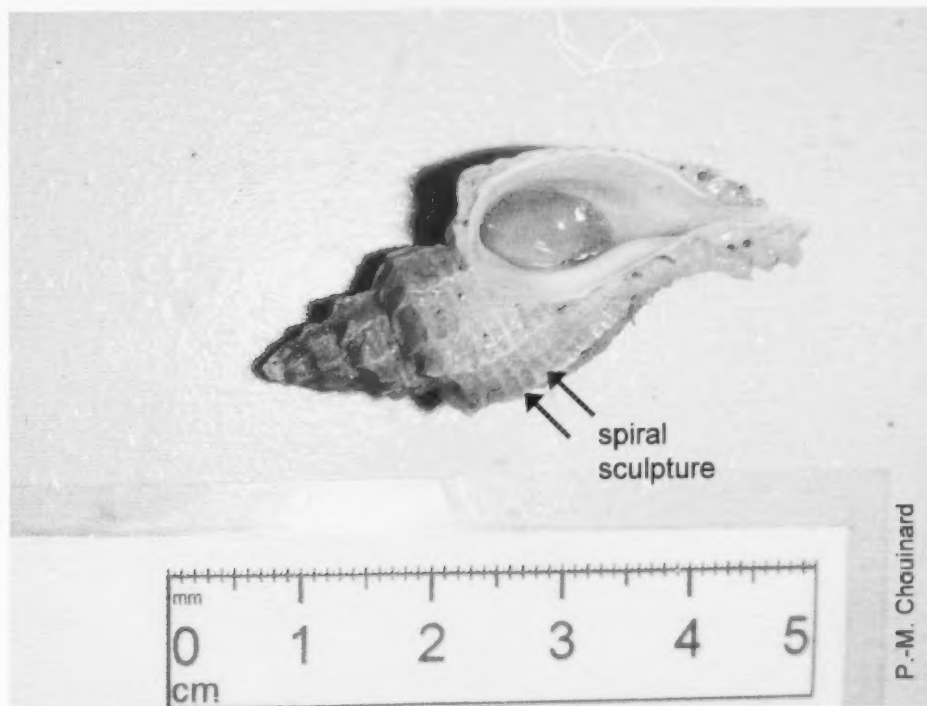


Mollusca - Gastropoda

Scabrotrophon fabricii (Møller, 1842)

AphiaID: 147146 MPO-QC: 3491 Photos: 2011

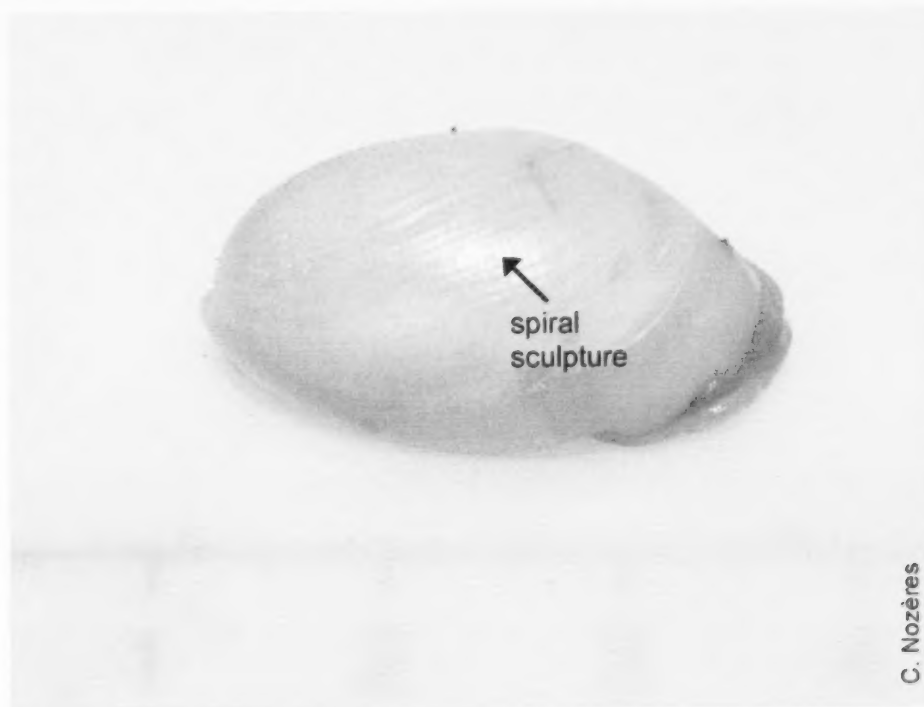
Confondu avec *Boreotrophon clathratus*



Mollusca - Gastropoda

Scaphander punctostriatus (Mighels & Adams, 1842)

AphiaID: 139490 MPO-QC: 3715 Photos: 2006-2013



Mollusca - Gastropoda

Limneria undata (T. Brown, 1839)

AphiaID: 159903 MPO-QC: 3459 Photos: 2007-2009



Velutina velutina (O. F. Müller, 1776)

AphiaID: 141905 MPO-QC: 3460 Photos: 2009, 2012



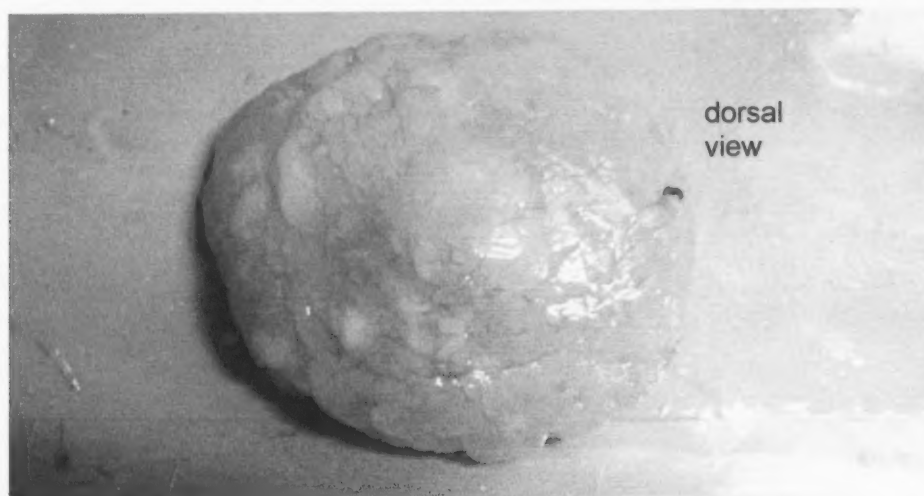
Mollusca - Gastropoda

***Onchidiopsis* sp.** Bergh, 1853

AphiaID: 138628 MPO-QC: 3455

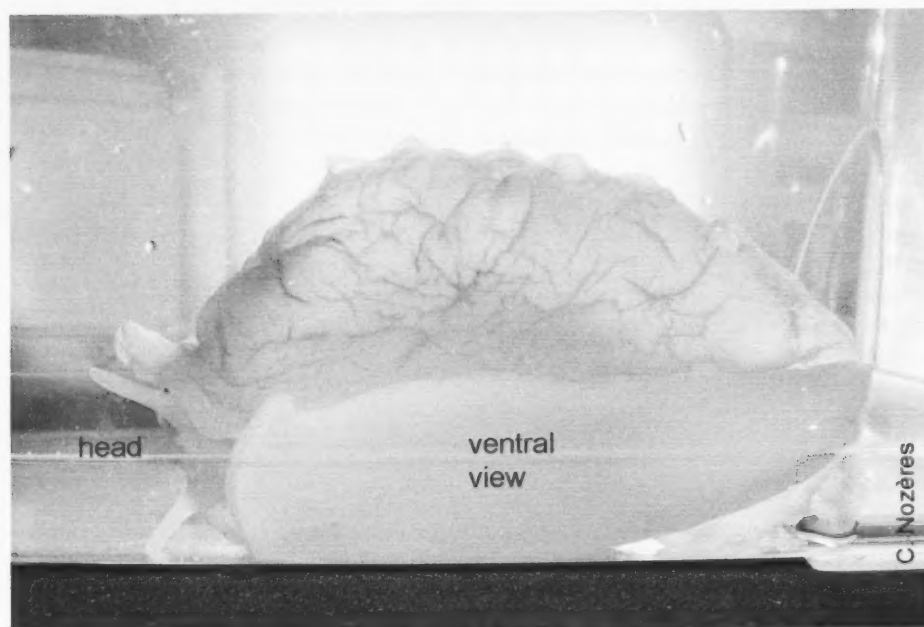
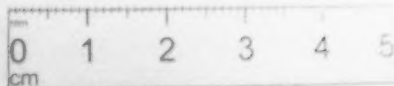
Photos: 2008, 2012

mistaken for Nudibranchia



dorsal
view

MPO-Institut Maurice Lamontagne
CP 1000, Mont-Joli QC G5H 3Z4



head

ventral
view

C. Nozères

Mollusca - Gastropoda (Nudibranchia)

***Dendronotus* sp.** Alder & Hancock, 1845

AphiaID: 137885 MPO-QC: 3893 Photos: 2006, 2008-2013



Mollusca - Gastropoda (Nudibranchia)

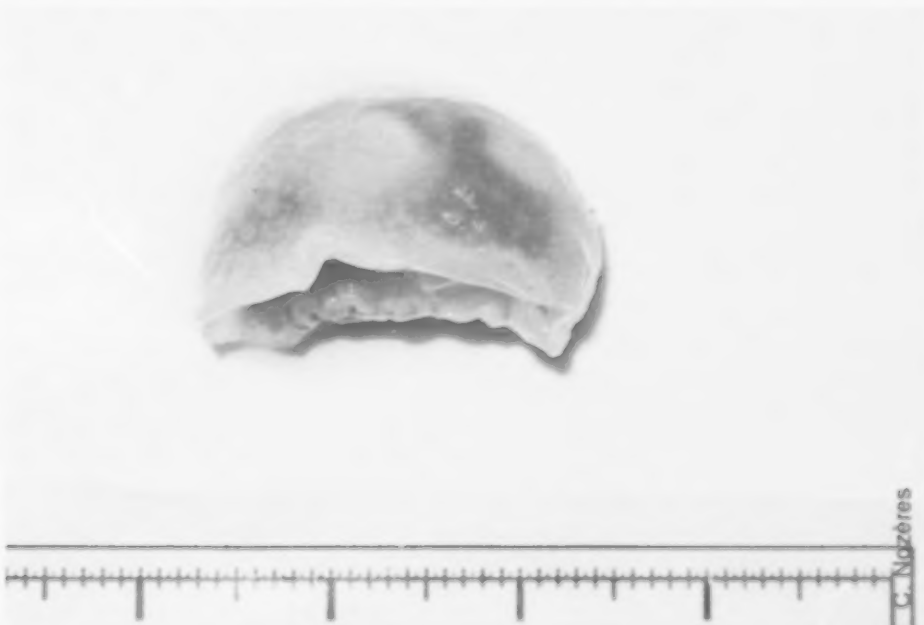
Colga villosa (Odhner, 1907)

AphialD: 146851 MPO-QC: 3908 Photos: 2006-2013



Doridoxa ingolfiana Bergh, 1899

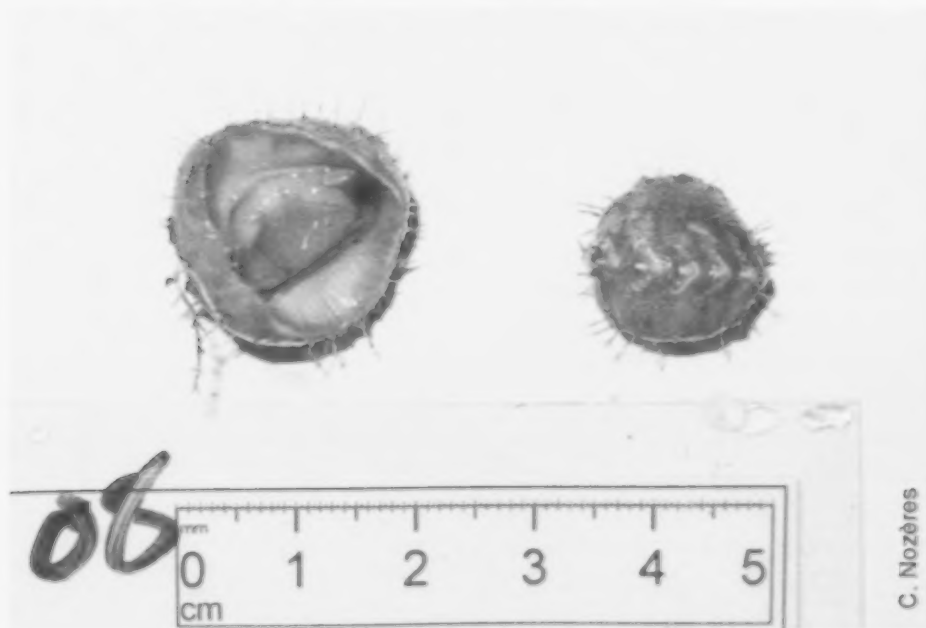
AphialD: 370549 MPO-QC: 3965 Photos: 2006-2013



Mollusca - Polyplacophora

Amicula vestita (Broderip & G. B. Sowerby I, 1829)

AphialID: 159928 MPO-QC: 3164 Photos: 2011



***Tonicella* sp.** Carpenter, 1873

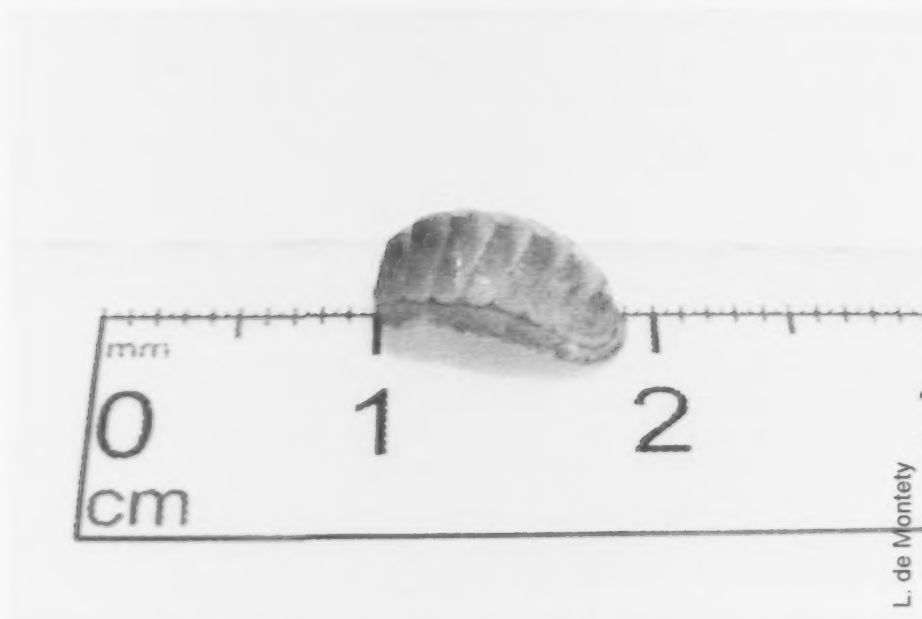
AphialID: 138090 MPO-QC: 3134 Photos: 2006, 2008, 2009, 2011



Mollusca - Polyplacophora

Stenosemus albus (Linnaeus, 1767)

AphiaID: 247773 MPO-QC: 3145 Photos: 2008-2009



Stenosemus exaratus (Sars G. O., 1878)

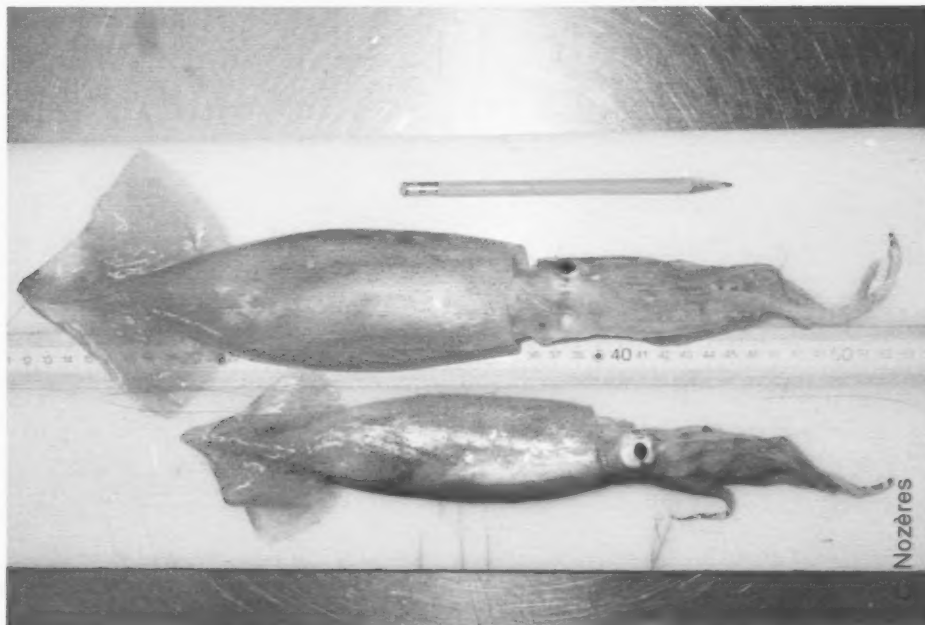
AphiaID: 386014 MPO-QC: 3146 Photos: 2006



Mollusca - Cephalopoda

Illex illecebrosus (Lesueur, 1821)

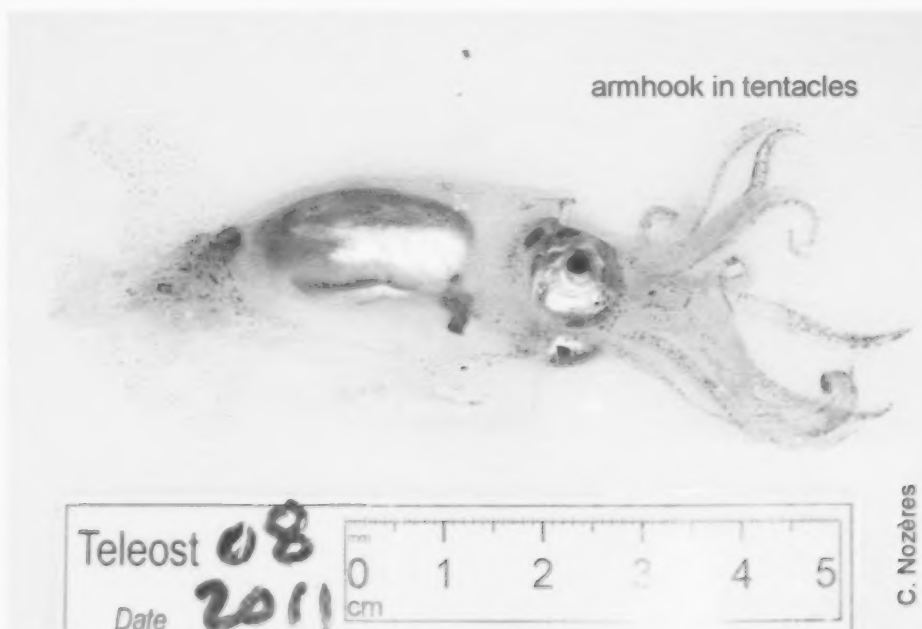
AphiaID: 153087 MPO-QC: 4753 Photos: 2005-2013



Gonatus fabricii (Lichtenstein, 1818)

AphiaID: 153097 MPO-QC: 4770 Photos: 2011

single capture of a juvenile at entrance to Gulf, off of Labrador



Mollusca - Cephalopoda

***Rossia* sp.** Owen, 1834

AphiaID: 138481 MPO-QC: 4557

Photos: 2005-2013

mistaken for *Bathypolypus bairdii*

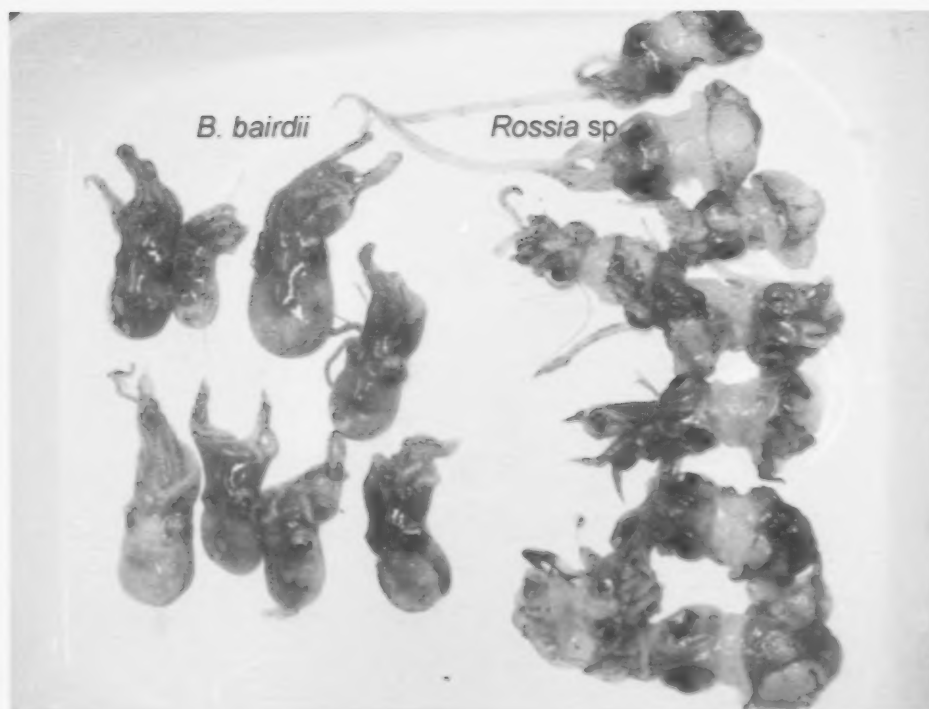
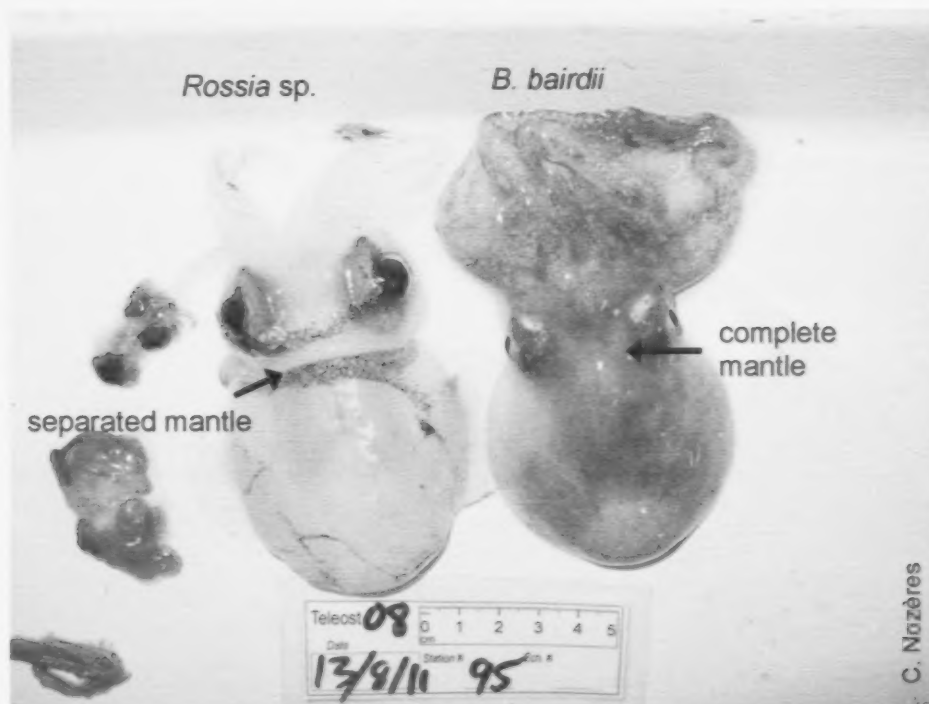


Mollusca - Cephalopoda

Bathypolypus bairdii (Verrill, 1873)

AphiaID: 157011 MPO-QC: 4904 Photos: 2006-2013

mistaken for *Rossia* sp., *Bathypolypus arcticus* (absent; Labrador)

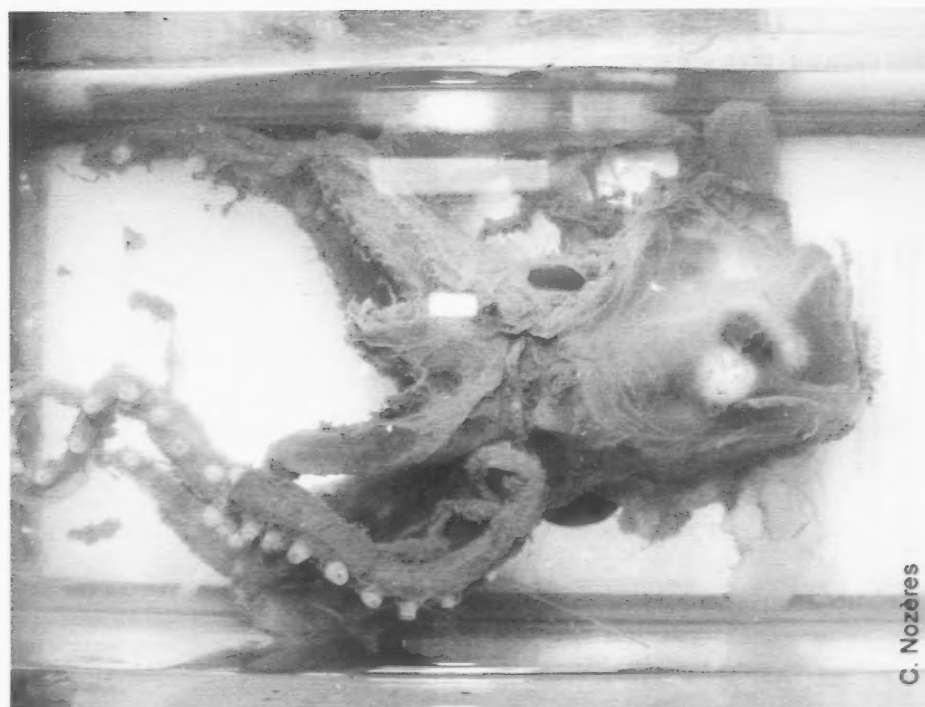
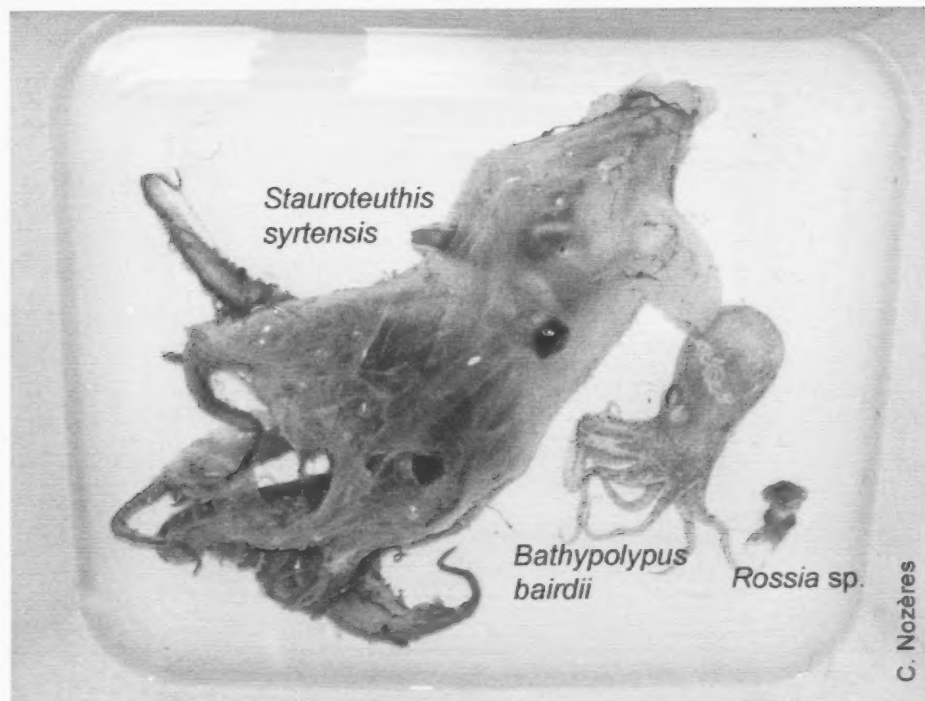


Mollusca - Cephalopoda

Stauroteuthis syrtensis Verrill, 1879

AphiaID: 153122 MPO-QC: 4853 Photos: 2005-2007, 2013

mistaken for jellyfishes (gelatinous body)



Appendix 4. Arthropoda

Examples in images, with their taxonomic names, WoRMS code (AphiaID), DFO-Quebec regional code (MPO-QC), and years in which they were seen (Photos). The order of images is selected to compare similar species, first with common taxa, followed by rare captures.

List of taxa (alphabetical by subgroup)

Subphylum	Class	Order	Name
Crustacea	Malacostraca	Amphipoda	<i>Aeginina longicornis</i>
			<i>Anonyx</i> sp.
			<i>Epimeria loricata</i>
			<i>Eusirus cuspidatus</i>
			<i>Hyperia galba</i>
			<i>Maera loveni</i>
			<i>Melita dentata</i>
			<i>Neohela monstrosa</i>
			<i>Oedicerus saginatus</i>
			<i>Paramphithoe hystrix</i>
			<i>Pardalisca abyssi</i>
			<i>Rhachotropis aculeata</i>
			<i>Stegocephalus inflatus</i>
			<i>Themisto compressa</i>
			<i>Themisto libellula</i>
			<i>Wimvadocus torelli</i>
		Isopoda	<i>Aega psora</i>
			<i>Syscenus infelix</i>
		Decapoda	<i>Calocaris templemani</i>
			<i>Cancer irroratus</i>
			<i>Chionoecetes opilio</i>
			<i>Hyas araneus</i>
			<i>Hyas coarctatus</i>
			<i>Lithodes maja</i>
			<i>Munidopsis curvirostra</i>
			<i>Pagurus</i> sp.
		Euphausiacea	<i>Meganctiphanes norvegica</i>
			<i>Thysanoessa</i> sp.
		Mysida	<i>Boreomysis</i> sp.
			<i>Mysis</i> sp.
	Maxillopoda (infraclass Cirripedia)	Sessilia	<i>Arcoscalpellum michelottianum</i>
			Balanidae
			<i>Chirona hameri</i>
Chelicerata	Pycnogonida		<i>Nymphon</i> sp.
			<i>Pycnogonum litorale</i>

Crustacea - Amphipoda

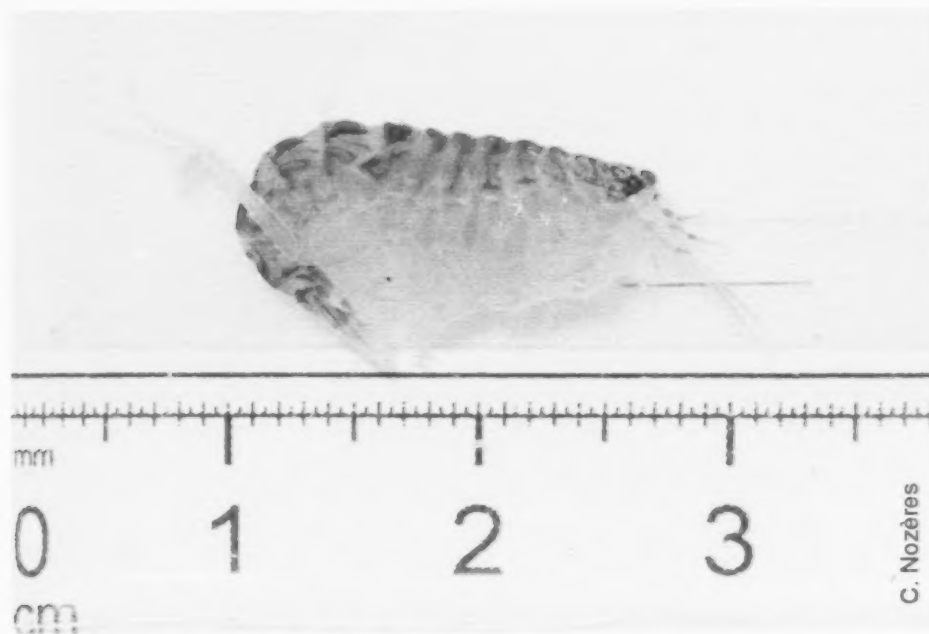
***Aeginina longicornis* (Krøyer, 1843)**

AphiaID: 101820 MPO-QC: 7890 Photos: 2009



***Oediceros saginatus* Krøyer, 1842**

AphiaID: 102908 MPO-QC: 7555 Photos: 2011



Crustacea - Amphipoda

Epimeria loricata G.O. Sars, 1879

AphiaID: 102146 MPO-QC: 7383 Photos: 2006-2011, 2013



Paramphithoe hystrix (Ross, 1835)

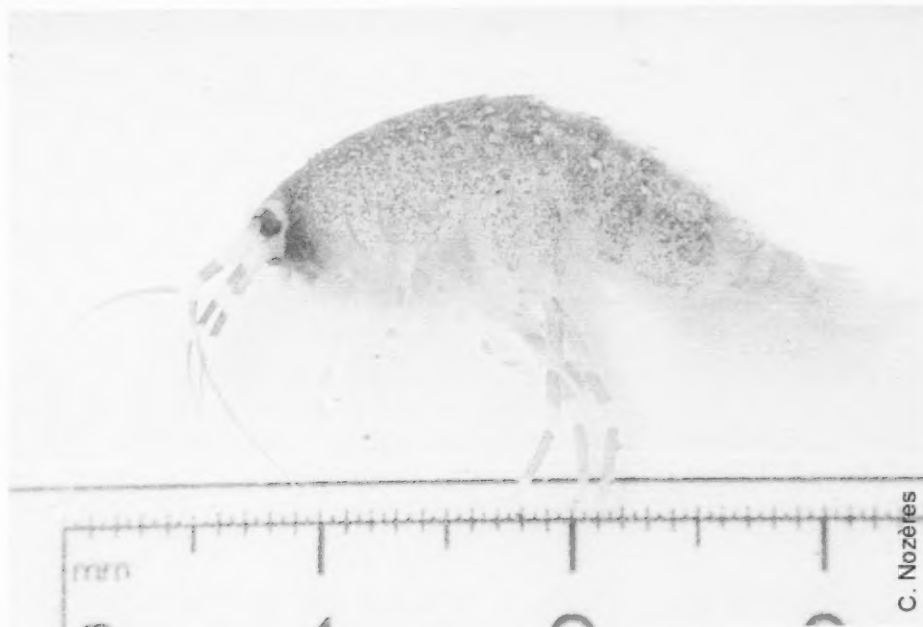
AphiaID: 102152 MPO-QC: 7586 Photos: 2006-2012



Crustacea - Amphipoda

***Eusirus cuspidatus* Krøyer, 1845**

AphiaID: 102199 MPO-QC: 7195 Photos: 2006-2013
mistaken for *Rhachotropis aculeata*



Crustacea - Amphipoda

Rhachotropis aculeata (Lepechin, 1970)

AphialD: 102224 MPO-QC: 7211 Photos: 2006-2013
mistaken for *Eusirus cuspidatus*



C. Nozères

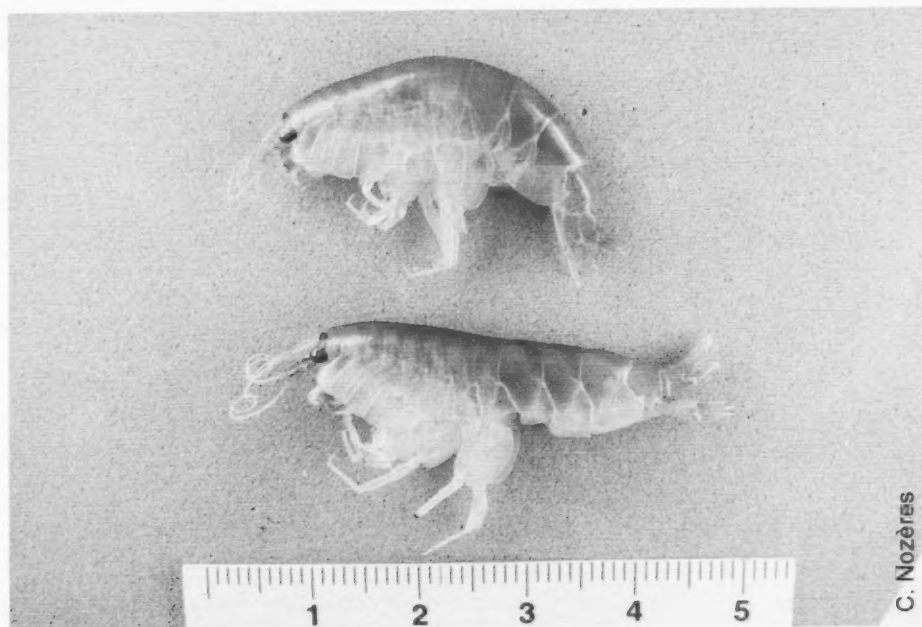


Crustacea - Amphipoda

***Anonyx* sp** Krøyer, 1838

AphialD: 101592 MPO-QC: 7389

Photos: 2006-2013

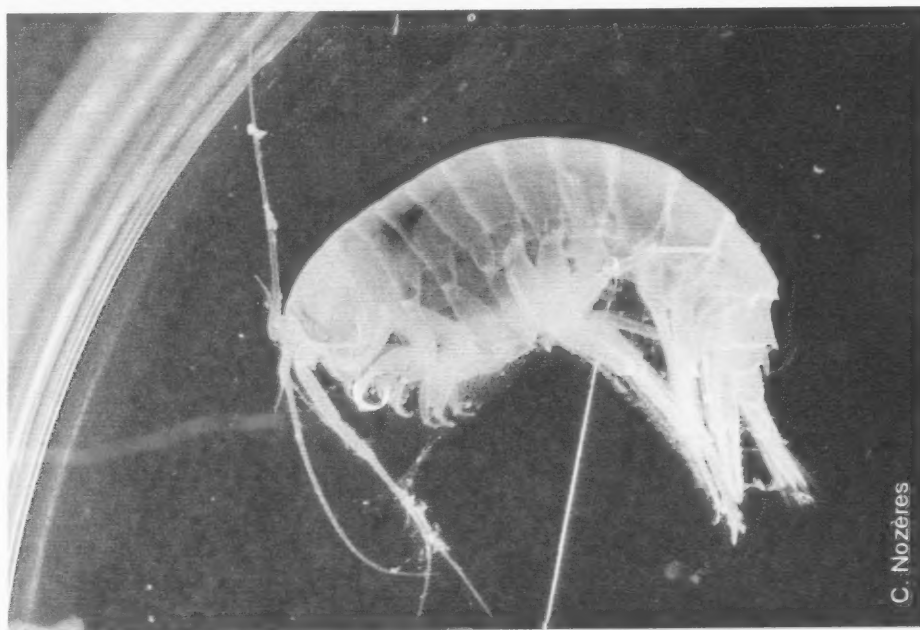


C. Nozères

Pardalisca abyssi Boeck, 1871

AphialD: 102945 MPO-QC: 7594 Photos: 2007

mistaken for *Weyprechtia pinguis* (not shown)



C. Nozères

Crustacea - Amphipoda

Neohela monstrosa (Boeck, 1861)

AphiaID: 102108 MPO-QC: 7483 Photos: 2006-2013
mistaken for *Maera loveni*, *Melita dentata*, *Wimvadocus torelli*



Crustacea - Amphipoda

Wimvadocus torelli (Goës, 1866)

AphiaID: 535546 MPO-QC: 7691 Photos: 2010
mistaken for *Maera loveni*, *Neohela monstrosa*



body laterally flattened



C. Nozères

Crustacea - Amphipoda

Melita dentata (Kroyer, 1842)

AphialID: 102837 MPO-QC: 7268

Photos: 2012

body laterally flattened



Maera loveni (Bruzellius, 1859)

AphialID: 102820 MPO-QC: 7279

Photos: 2011

mistaken for *Neohela monstrosa*, *Wimvadocus torelli*

body laterally flattened

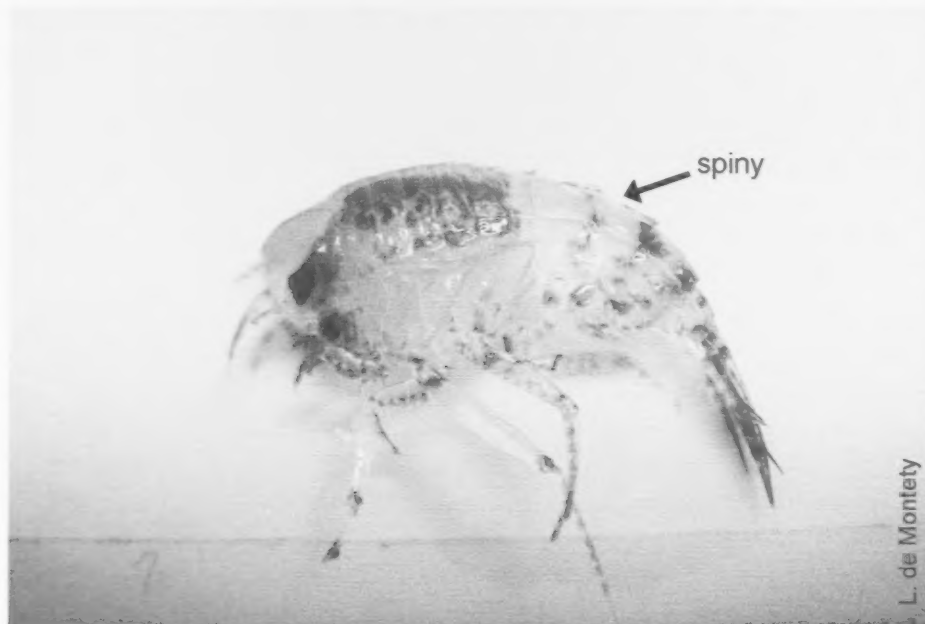


Crustacea - Amphipoda

Themisto compressa Goës, 1865

AphiaID: 156451 MPO-QC: 6970 Photos: 2009, 2012

mistaken for *Themisto libellula*



Teleost	09	0 1 2 3 4 5 cm				
Date	10.8.12	Station #	74	Ech. #		

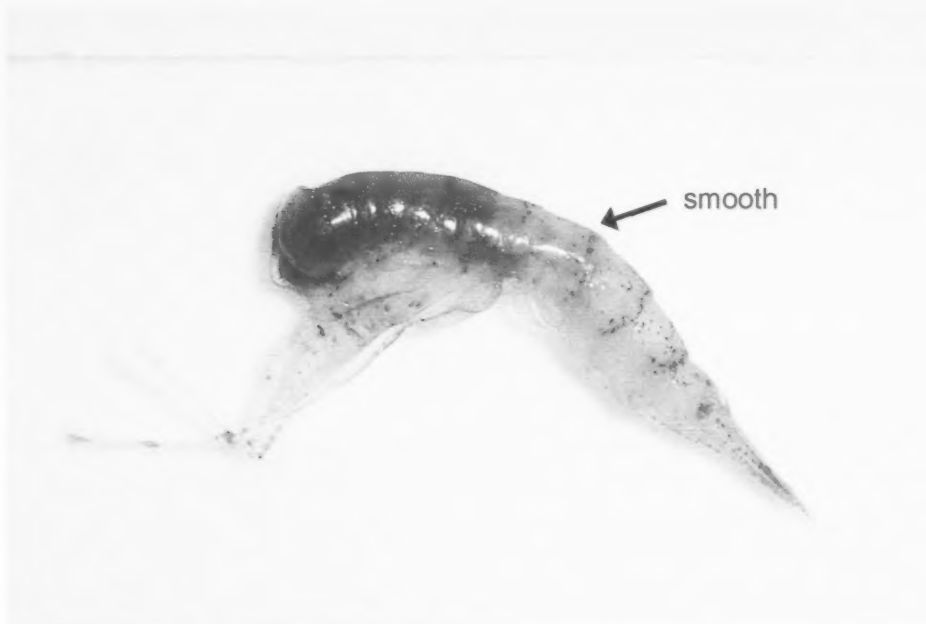


Crustacea - Amphipoda

Themisto libellula Lichtenstein, 1822

AphiaID: **156452** MPO-QC: **6972** Photos: **2006-2013**

mistaken for *Themisto compressa*



Crustacea - Amphipoda

Hyperia galba (Montagu, 1815)

AphiaID: 103251 MPO-QC: 6977 Photos: 2008, 2011, 2013
associated with jellyfishes, e.g., *Aurelia aurita*



Crustacea - Amphipoda

Stegocephalus inflatus Krøyer, 1842

AphialD: 103105 MPO-QC: 7750 Photos: 2006-2012
mistaken for *Hyperia galba*

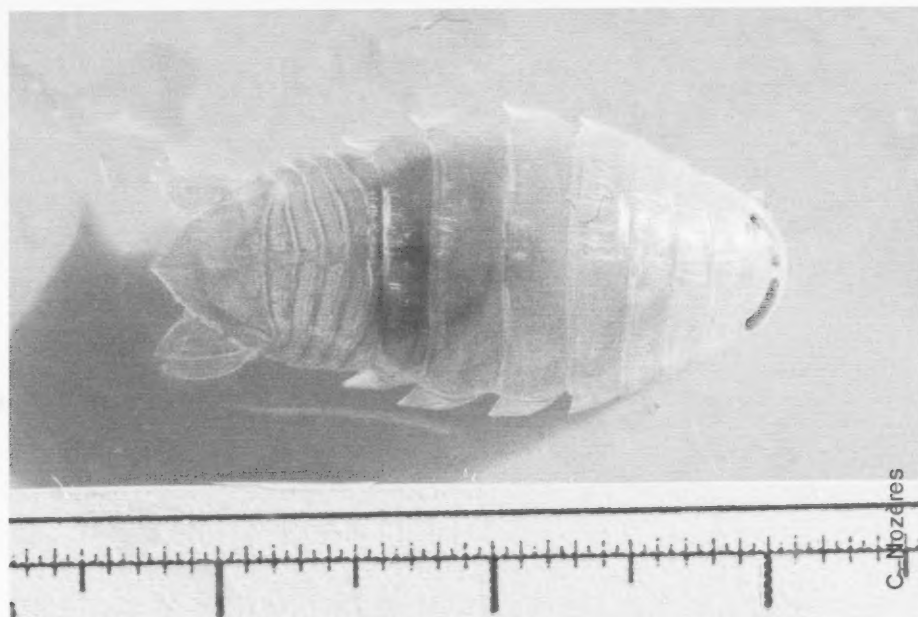


Crustacea - Isopoda

Aega psora (Linnaeus, 1758)

AphiaID: 118827 MPO-QC: 6771
fish ectoparasite

Photos: 2006-2011, 2013

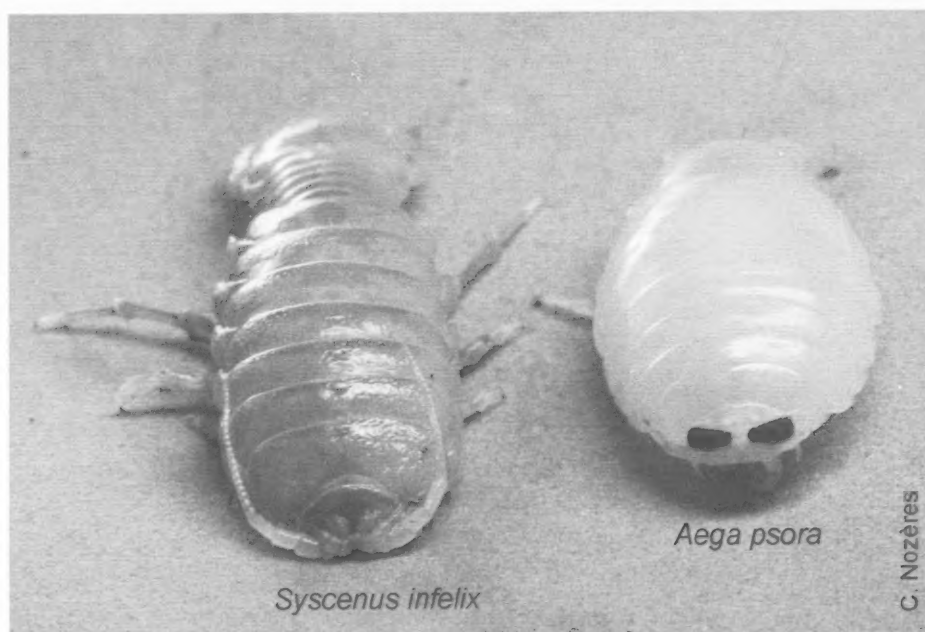


Crustacea - Isopoda

Syscenus infelix Harger, 1880

AphiaID: 156446 MPO-QC: 6791 Photos: 2005-2013

blind ectoparasite of the macrourid fish, marlin-spike (*Nezumia bairdii*)



Crustacea - Decapoda

Chionoecetes opilio (O. Fabricius, 1788)

AphiaID: 107315 MPO-QC: 8213 Photos: 2005-2013



C. Nozères

Lithodes maja (Linnaeus, 1758)

AphiaID: 107205 MPO-QC: 8196 Photos: 2005-2013



C. Nozères

Crustacea - Decapoda

Hyas araneus (Linnaeus, 1758)

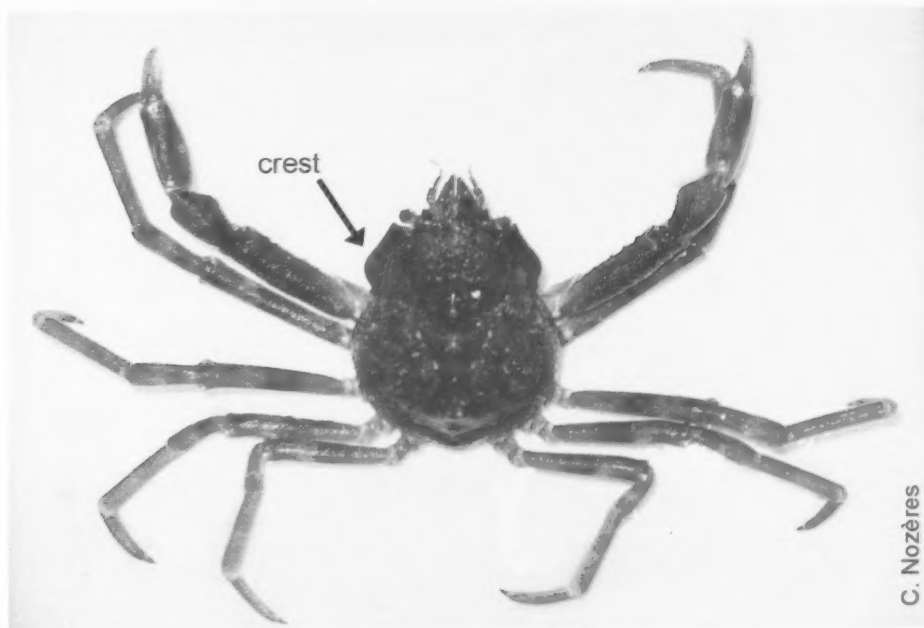
AphiaID: 107322 MPO-QC: 8217 Photos: 2005-2013



C. Nozères

Hyas coarctatus Leach, 1816

AphiaID: 107323 MPO-QC: 8218 Photos: 2005-2013



C. Nozères

Crustacea - Decapoda

Cancer irroratus Say, 1817

AphiaID: 158057 MPO-QC: 8206

Photos: 2006

common coastal species



***Pagurus* sp.** Fabricius, 1775

AphiaID: 106854 MPO-QC: 8178

Photos: 2006-2013

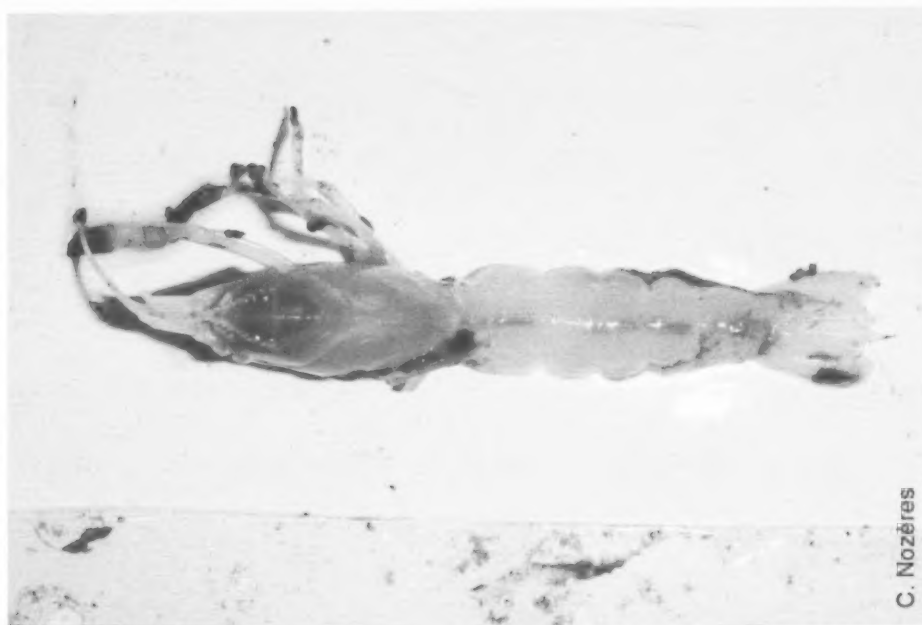


M. Bourque

Crustacea - Decapoda

Calocaris templemani Squires, 1965

AphialD: 158383 MPO-QC: 8173 Photos: 2009, 2011-2013



Crustacea - Decapoda

Munidopsis curvirostra Whiteaves, 1874

AphiaID: 107175 MPO-QC: 8164 Photos: 2005-2013



Crustacea - Mysida

***Boreomysis* sp.** G.O. Sars, 1869

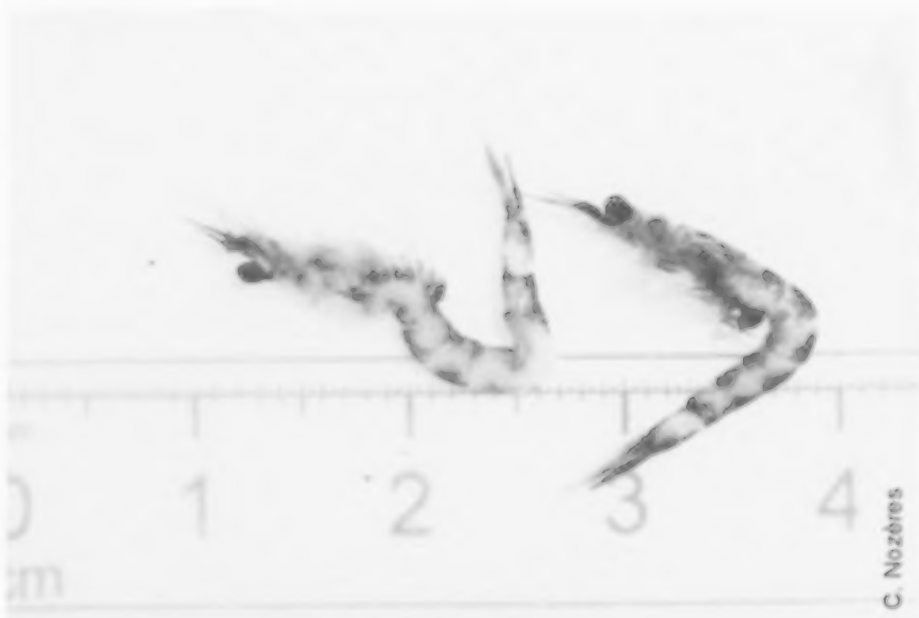
AphiaID: 119842 MPO-QC: 7933 Photos: 2007, 2013
deepwater zooplankton



C. Nozères

***Mysis* sp.**

AphiaID: 119886 MPO-QC: 7967 Photos: 2012
coastal zooplankton



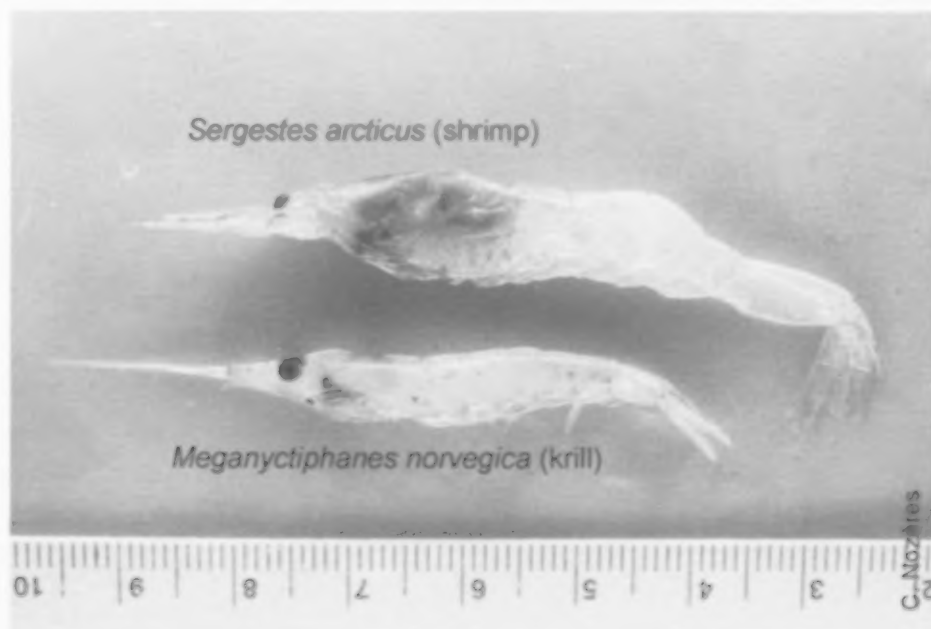
C. Nozères

Crustacea - Euphausiacea

Meganyctiphanes norvegica (M. Sars, 1857)

AphiaID: 110690 MPO-QC: 7994 Photos: 2007, 2011-2013

mistaken for *Sergestes arcticus*, *Thysanoessa* sp.



***Thysanoessa* sp.** Brandt, 1851

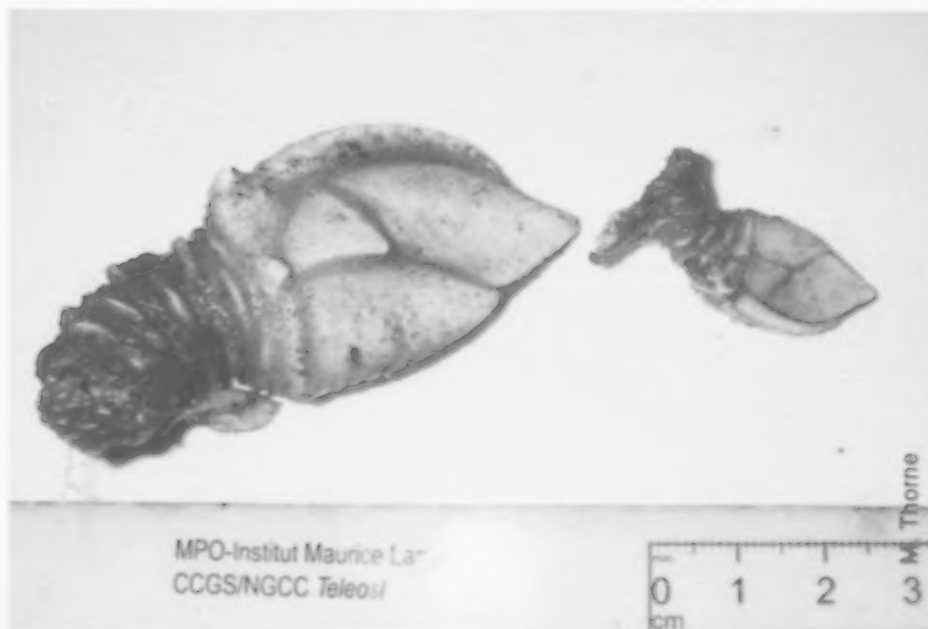
AphiaID: 110679 MPO-QC: 8000 Photos: 2012



Crustacea - Cirripedia

Arcoscalpellum michelottianum (Seguenza, 1876)

AphiaID: 106182 MPO-QC: 6594 Photos: 2006-2013



Crustacea - Cirripedia

Balanidae Leach, 1806

AphiaID: 106057 MPO-QC: 6595 Photos: 2007-2013
mistaken for small specimens of *Chirona hameri*



Chirona hameri (Ascanius, 1767)

AphiaID: 106207 MPO-QC: 6593 Photos: 2005-2013
smaller specimens mistaken for Balanidae

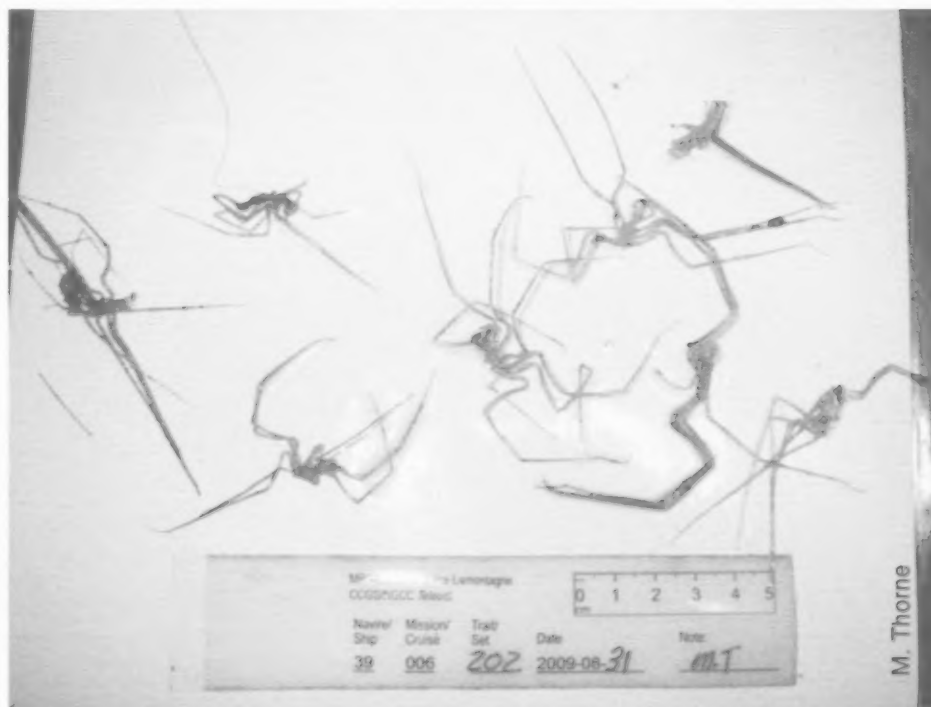


Pycnogonida

***Nymphon* sp.** Fabricius, 1794

AphiaID: 134591 MPO-QC: 5961

Photos: 2006-2013



Pycnogonida

Pycnogonum litorale (Strom, 1762)

AphiaID: 239867 MPO-QC: 5975 Photos: 2005



M. Lévesque

Appendix 5. Other invertebrates

Examples in images, with their taxonomic names, WoRMS code (*AphiaID*), DFO-Quebec regional code (*MPO-QC*), and years in which they were seen (*Photos*). The order of images is selected to compare similar species, first with common taxa, followed by rare captures. Note that identifications with these images may need further confirmation (marked by *).

List of taxa (alphabetical by subgroup)

Grouping	Name
Ascidacea	<i>Ascidia</i> sp.
	<i>Boltenia echinata</i>
	<i>Boltenia ovifera</i>
	<i>Botrylloides</i> sp.
	<i>Cnemidocarpa finmarkiensis</i>
	<i>Dendrodoa carnea</i>
	<i>Dendrodoa pulchella</i> *
	<i>Didemnum</i> sp.
	<i>Eudistoma vitreum</i> *
	<i>Halocynthia pyriformis</i>
	<i>Pelonaia corrugata</i>
	<i>Polycarpa fibrosa</i> *
	<i>Styela rustica</i>
	<i>Synoicum pulmonaria</i>
Brachiopoda	<i>Hemithiris psittacea</i>
	<i>Terebratulina septentrionalis</i>
Bryozoa	<i>Acyonidium</i> sp.
	<i>Reteporella grimaldii</i>
	<i>Securiflustra securifrons</i>
Ctenophora	<i>Pleurobrachia pileus</i>
Echiura	<i>Hamingia arctica</i> *
	<i>Pseudobonellia iraidii</i> *
Nemertea	Nemertea
Polychaeta	<i>Amphitrite cirrata</i>
	<i>Aphroditella hastata</i>
	<i>Austrolaenilla mollis</i>
	<i>Axionice maculata</i>
	<i>Brada inhabilis</i>
	<i>Chone</i> sp.
	<i>Cistenides granulata</i>
	<i>Eunice pennata</i>
	<i>Eunoe nodosa</i>
	<i>Harmothoe</i> sp.

	<i>Euphrosine borealis</i>
	<i>Glycera capitata</i>
	<i>Goniada norvegica</i>
	<i>Laetmonice filicornis</i>
	<i>Maldane sarsi</i>
	<i>Melinna cristata</i>
	<i>Neoleanira tetragona</i>
	<i>Nephtys</i> sp.
	<i>Nereis pelagica</i>
	<i>Onuphis quadricuspis</i>
	<i>Phyllodoce groenlandica</i>
	<i>Polyphysia crassa</i>
	<i>Scalibregma inflatum</i>
	<i>Terebellides stroemii</i>
Porifera	<i>Asconema foliatum</i>
	<i>Isodictya palmata</i> (to confirm)
	<i>Phakellia</i> sp.
	<i>Polymastia</i> sp.
	<i>Radiella hemisphaerica</i>
	<i>Stylocordyla borealis</i>
	<i>Suberites ficus</i>
	<i>Sycon</i> sp.
	<i>Tentorium semisuberites</i>
	<i>Thenea muricata</i>
Priapulida	<i>Priapulus caudatus</i>
Sipuncula	<i>Golfingia margaritacea</i> *
	<i>Phascolion strombus strombus</i> *
Turbellaria	<i>Fecampiidae</i>

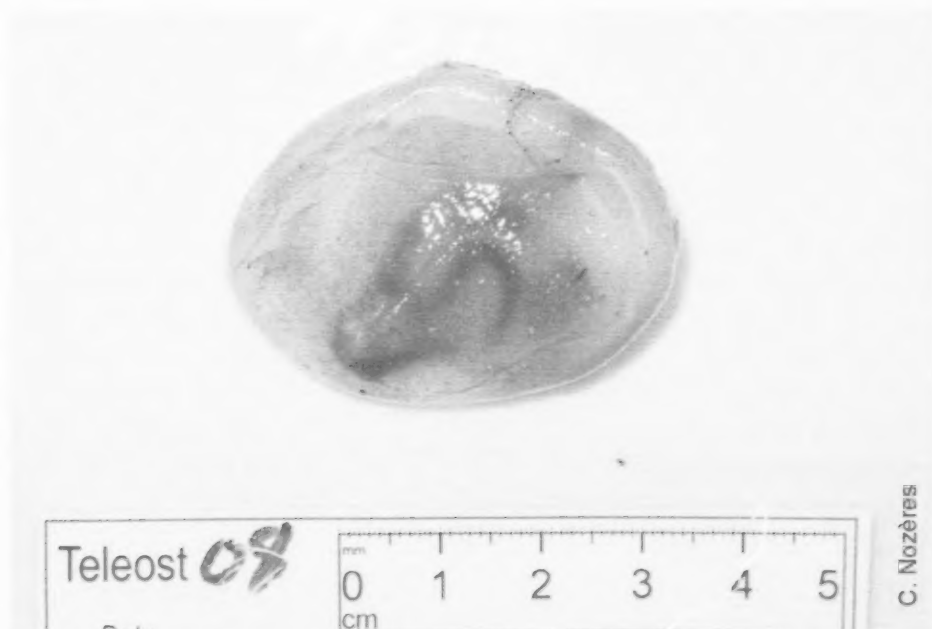
Asciacea

***Ascidia* sp.** Linnaeus, 1767

AphiaID: 103483 MPO-QC: 8742

Photos: 2006-2013

unconfirmed identification



Ascidacea

Eudistoma vitreum (Sars, 1851)

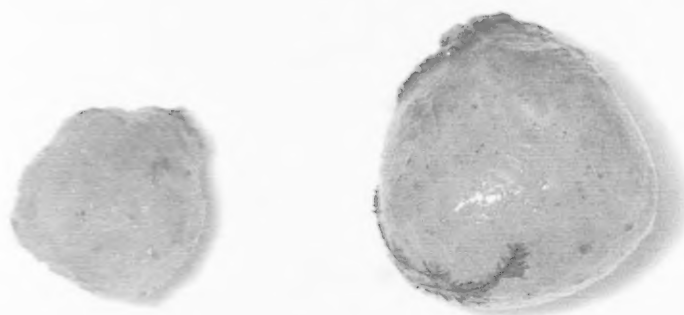
AphiaID: 103624 MPO-QC: 8778 Photos: 2006-2013
unconfirmed identification



Ascidiacea

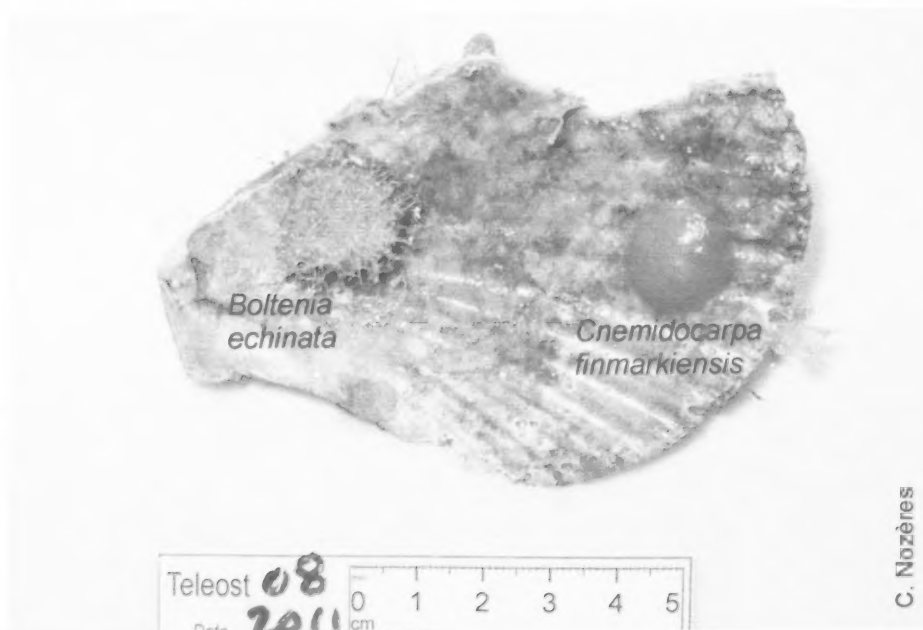
Synoicum pulmonaria (Ellis & Solander, 1786)

AphiaID: 103692 MPO-QC: 8776 Photos: 2007, 2011



Asciidiacea

Cnemidocarpa finmarkiensis (Kiaer, 1893)
AphiaID: 103870 MPO-QC: 8757 Photos: 2011



Dendrodoa carnea (Agassiz, 1850)
AphiaID: 103881 MPO-QC: 8759 Photos: 2009



Ascidiacea

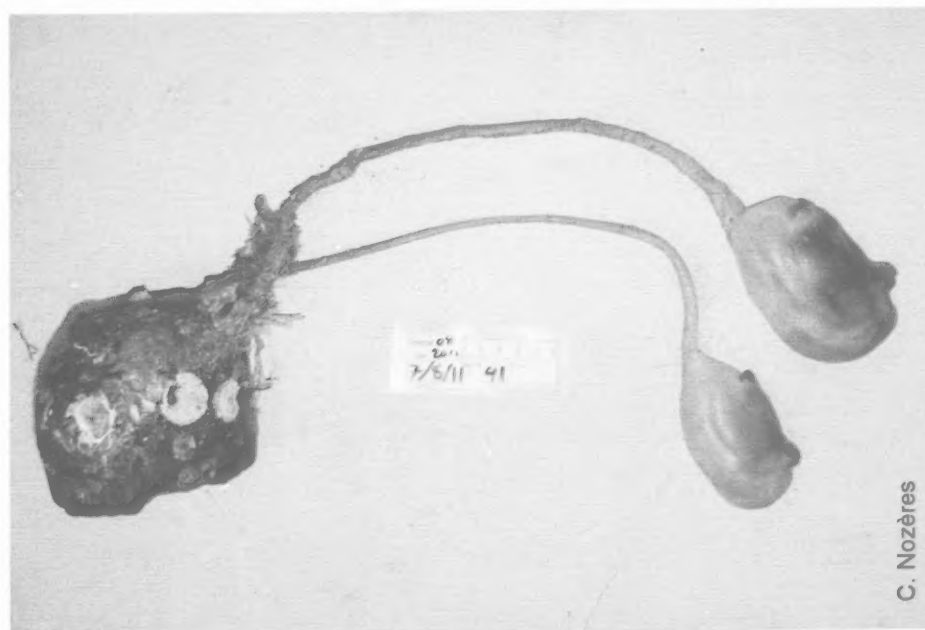
Boltenia echinata (Linnaeus, 1767)

AphiaID: 103814 MPO-QC: 8793 Photos: 2006, 2008, 2010-2013



Boltenia ovifera (Linnaeus, 1767)

AphiaID: 103815 MPO-QC: 8792 Photos: 2006-2013



Asciidiacea

Halocynthia pyriformis (Rathke, 1806)

AphiaID: 103828 MPO-QC: 8797 Photos: 2007-2009, 2012, 2013



Pelonaia corrugata Goodsir & Forbes, 1841

AphiaID: 103894 MPO-QC: 8781 Photos: 2008, 2012



Asciadiacea

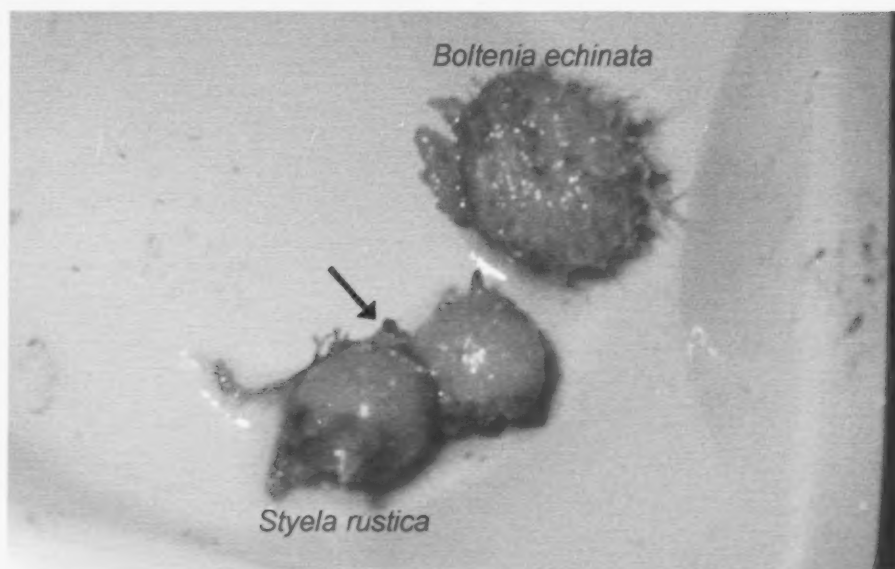
Polycarpa fibrosa (Stimpson, 1852)

AphiaID: 103902 MPO-QC: 8783 Photos: 2008, 2013
unconfirmed identification



Styela rustica Linnaeus, 1767

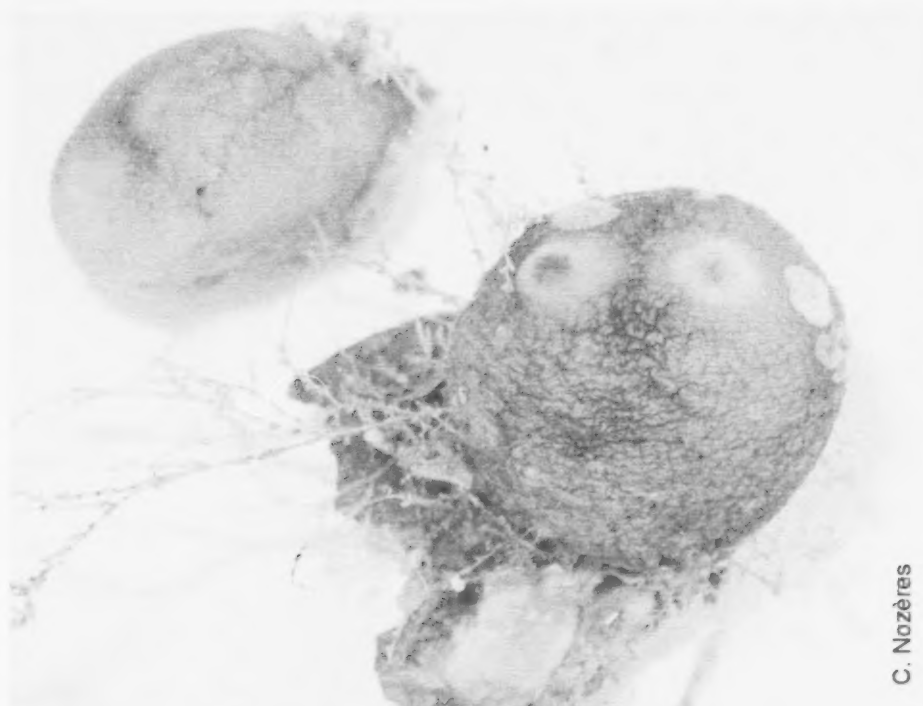
AphiaID: 103937 MPO-QC: 8801 Photos: 2010-2012



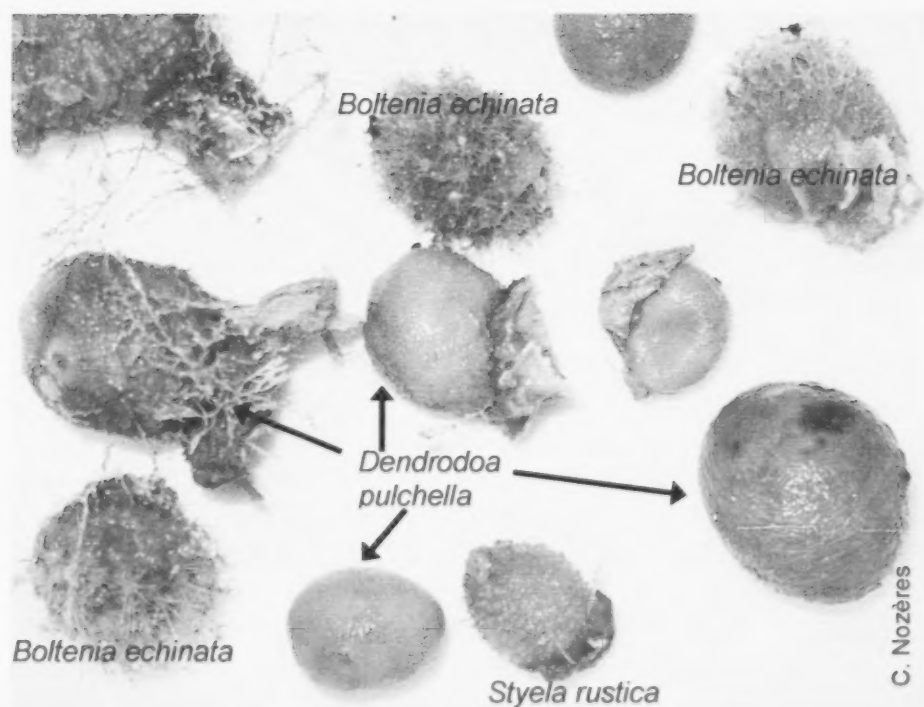
Ascidiacea

Dendrodoa pulchella (Verrill, 1871)

AphiaID: 103885 MPO-QC: 8761 Photos: 2011
unconfirmed identification



C. Nozères

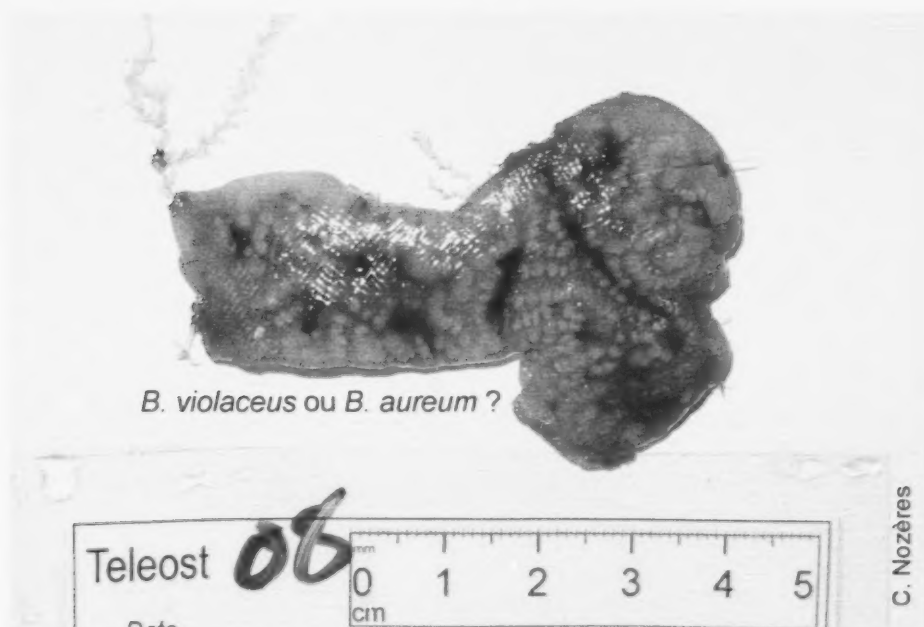


C. Nozères

Ascidacea

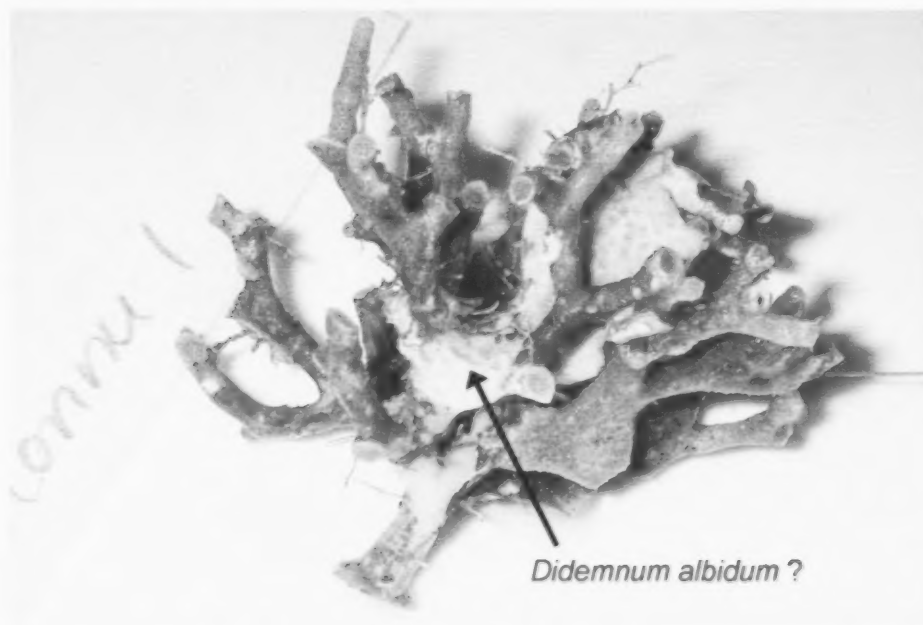
***Botrylloides* sp.** Milne-Edwards, 1841

AphiaID: 103528 MPO-QC: 8798 Photos: 2009, 2011-2013



***Didemnum* sp.** Savigny, 1816

AphiaID: 103456 MPO-QC: 8760 Photos: 2007



Brachiopoda

Hemithiris psittacea (Gmelin, 1790)

AphiaID: 104054 MPO-QC: 3090 Photos: 2006-2013



Terebratulina septentrionalis (Couthouy, 1838)

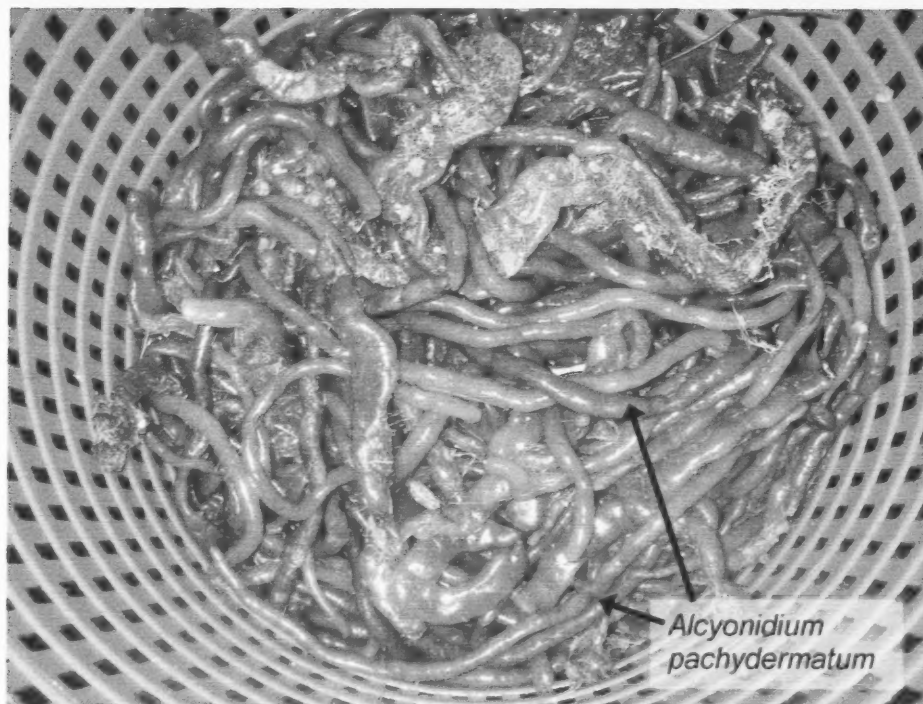
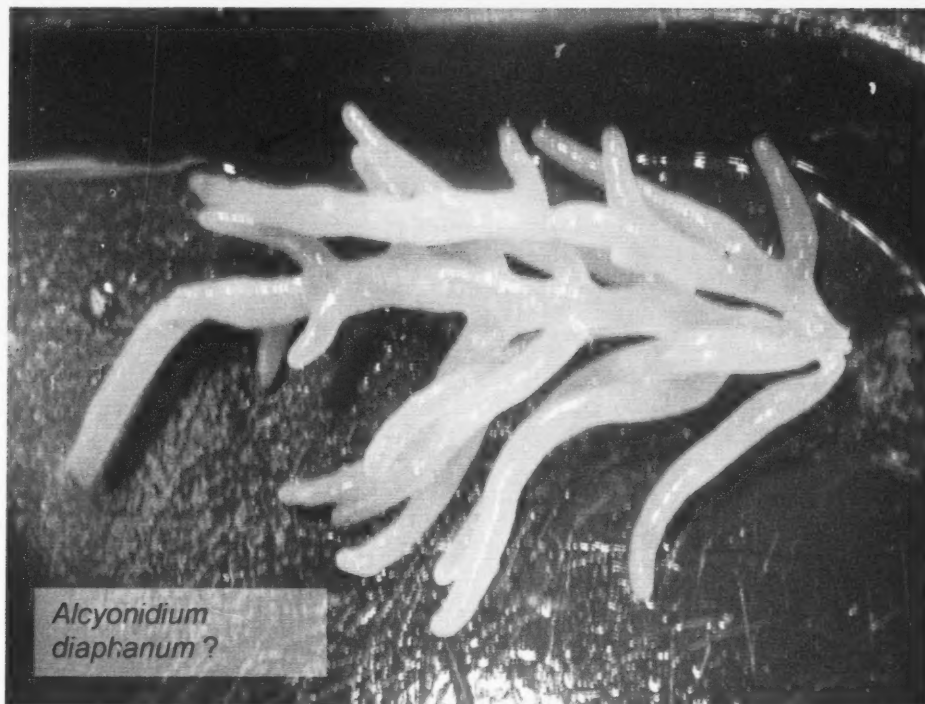
AphiaID: 104056 MPO-QC: 3101 Photos: 2006-2013
mistaken for Bivalvia



Bryozoa

***Alcyonidium* sp.** J.V.F. Lamouroux, 1813

AphiaID: 110993 MPO-QC: 2675 Photos: 2008-2010, 2012
mistaken for kelp seaweed or debris



Bryozoa

Reteporella grimaldii (Jullien, 1903)

AphialD: 111453 MPO-QC: 2681 Photos: 2005-2006



Securiflustra securifrons (Pallas, 1766)

AphialD: 111374 MPO-QC: 2679 Photos: 2006-2013

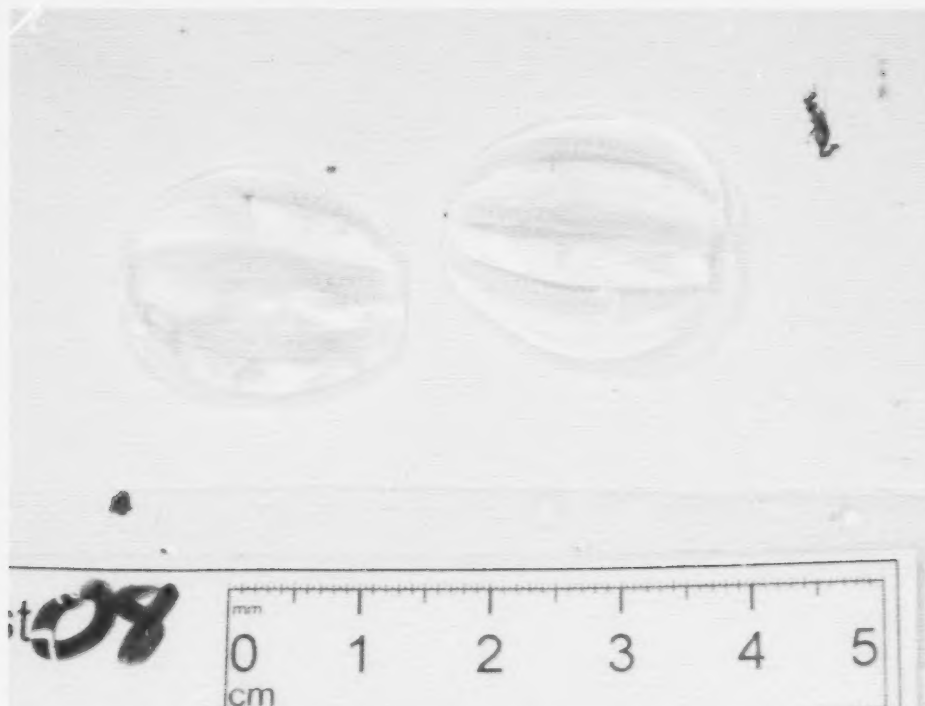
mistaken for *Caberea ellisi* (not shown here)



Ctenophora

Pleurobrachia pileus (O.F. Müller, 1776)

AphiaID: 106386 MPO-QC: 2255 Photos: 2008-2013
mistaken for Cnidaria (jellyfishes)

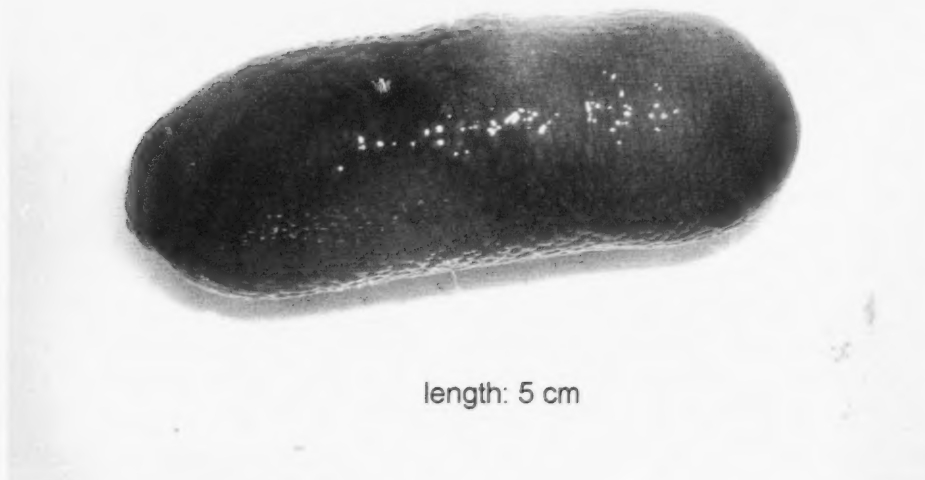


C. Nozères

Echiura

Hamingia arctica Danielssen & Koren, 1881

AphiaID: 110364 MPO-QC: 5934 Photos: 2008, 2009, 2011-2013



length: 5 cm

Pseudobonellia iraidii Murina, 1984 (to verify)

AphiaID: 157605 MPO-QC: 5935 Photos: 2008, 2009, 2011-2013

mistaken for debris, ascidians or holothuroids



Nemertea

Nemertea

AphiaID: 152391 MPO-QC: 3000 Photos: 2009, 2013
mistaken for Polychaeta



Polychaeta

Aphroditella hastata (Moore, 1905)

AphiaID: 333005 MPO-QC: 5002 Photos: 2006-2013

small specimens mistaken for *Laetmonice filicornis*



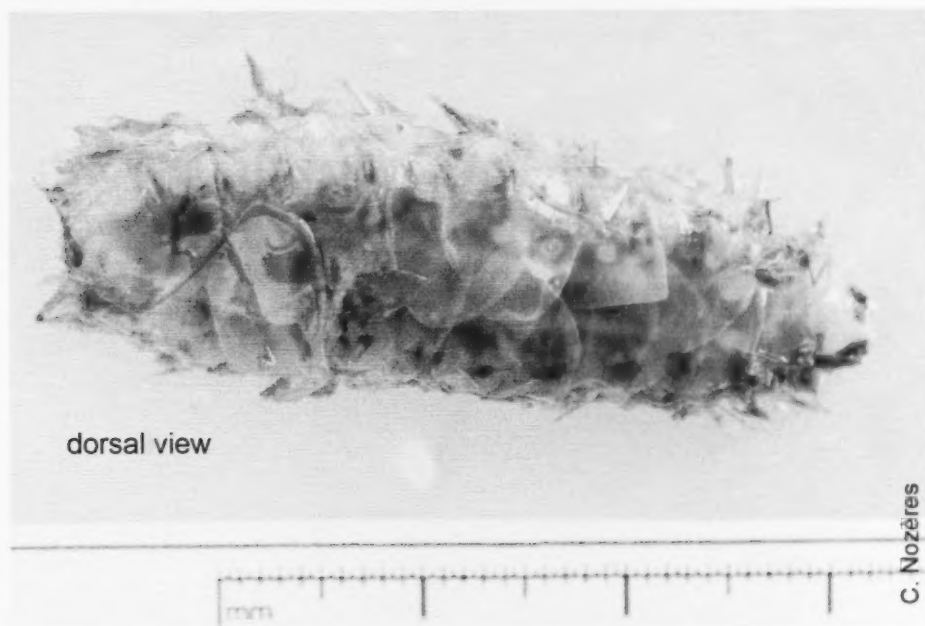
small specimen



Polychaeta

Laetmonice filicornis Kinberg, 1855

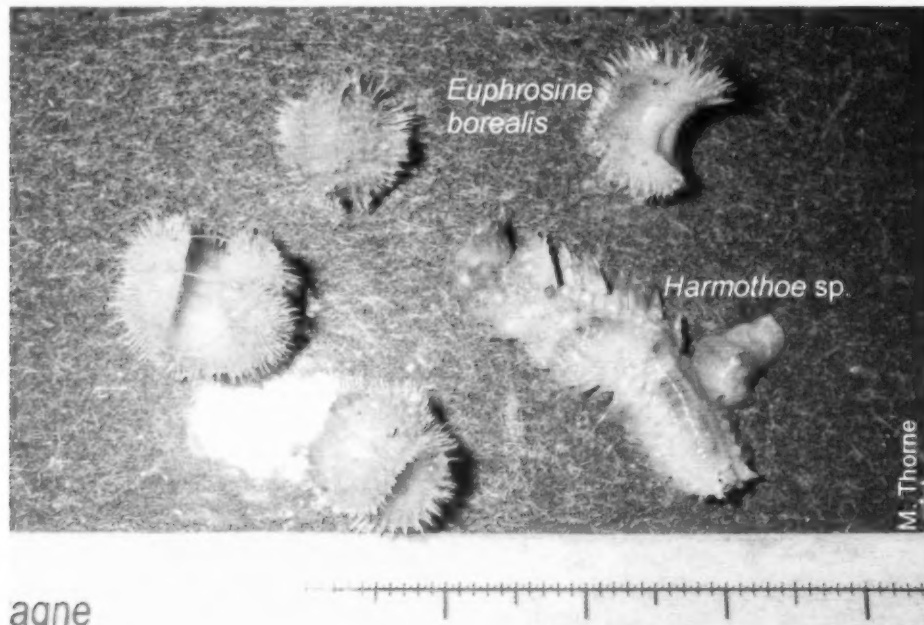
AphiaID: 129844 MPO-QC: 5003 Photos: 2007-2009, 2011, 2013
mistaken for small specimens of *Aphroditella hastata*



Polychaeta

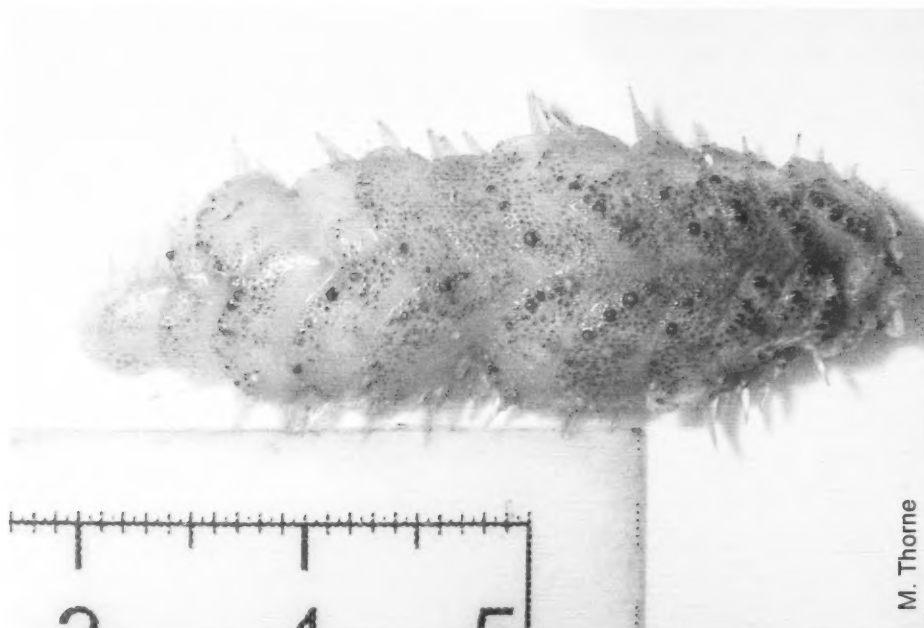
Euphrosine borealis Örsted, 1843

AphialD: 130081 MPO-QC: 5461 Photos: 2007, 2009-2010
often seen with *Harmothoe* sp.



***Harmothoe* sp.** Kinberg, 1856

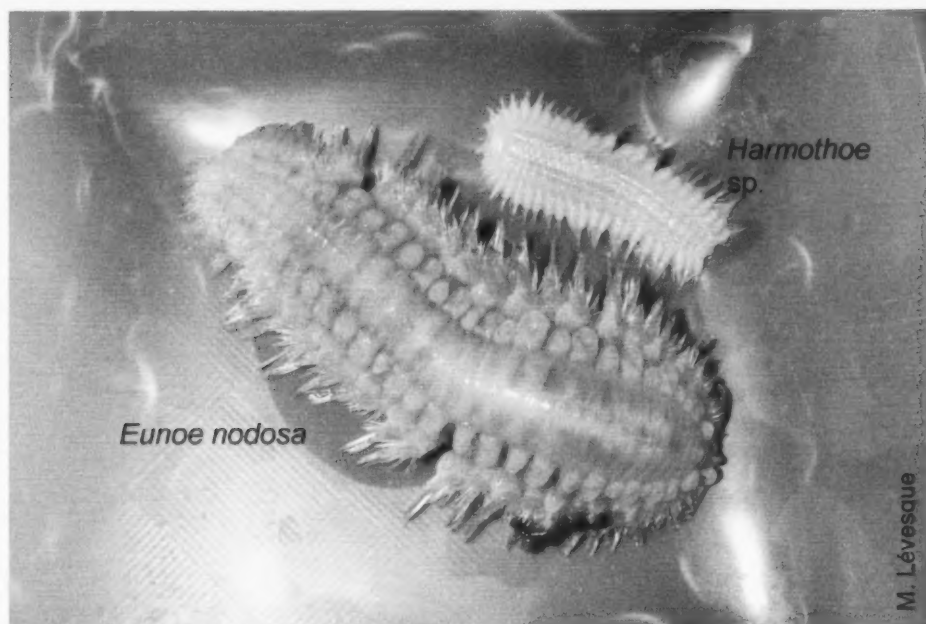
AphialD: 129491 MPO-QC: 5046 Photos: 2005-2009, 2011-2013



Polychaeta

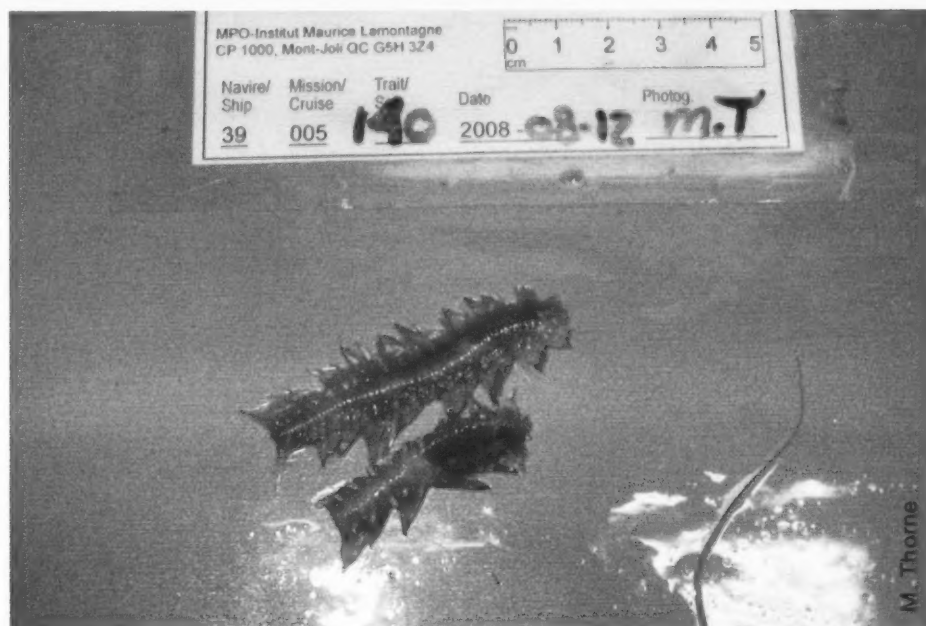
Eunoe nodosa (M. Sars, 1861)

AphiaID: 130745 MPO-QC: 5045 Photos: 2008



Austrolaenilla mollis (M. Sars, 1872)

AphiaID: 130725 MPO-QC: 5009 Photos: 2008



Polychaeta

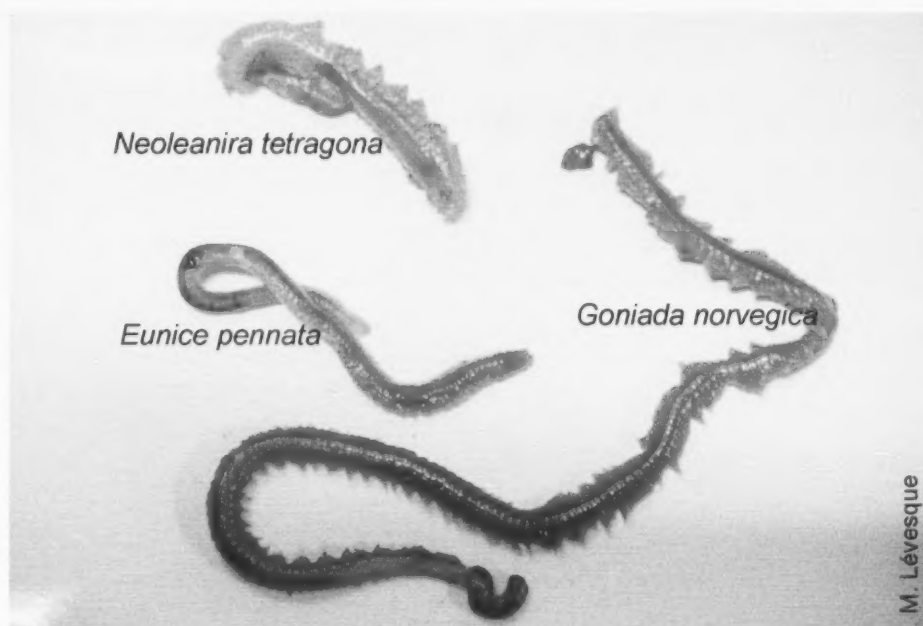
Eunice pennata (O.F. Müller, 1776)

AphialD: 130060 MPO-QC: 5479 Photos: 2007-2009



Goniada norvegica Örsted, 1845

AphialD: 130141 MPO-QC: 5089 Photos: 2007-2008



Polychaeta

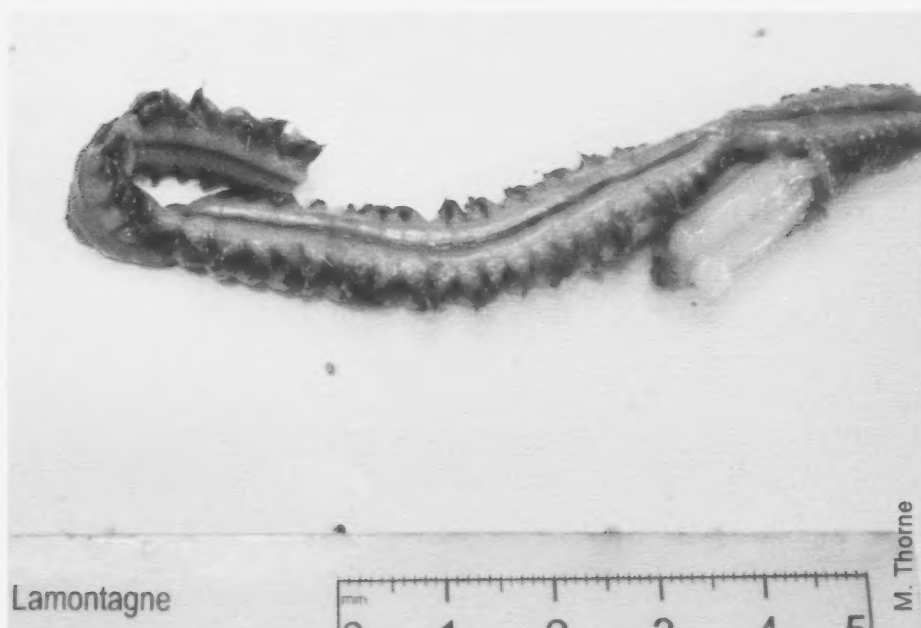
Neoleanira tetragona (Örsted, 1845)

AphiaID: 131069 MPO-QC: 5053 Photos: 2007-2009



***Nephtys* sp.** Cuvier, 1817

AphiaID: 129370 MPO-QC: 5113 Photos: 2009, 2011, 2013



Polychaeta

Nereis pelagica (Linnaeus, 1761)

AphiaID: 130404 MPO-QC: 5236 Photos: 2007



Phyllodoce groenlandica Örsted, 1842

AphiaID: 334506 MPO-QC: 4955 Photos: 2009



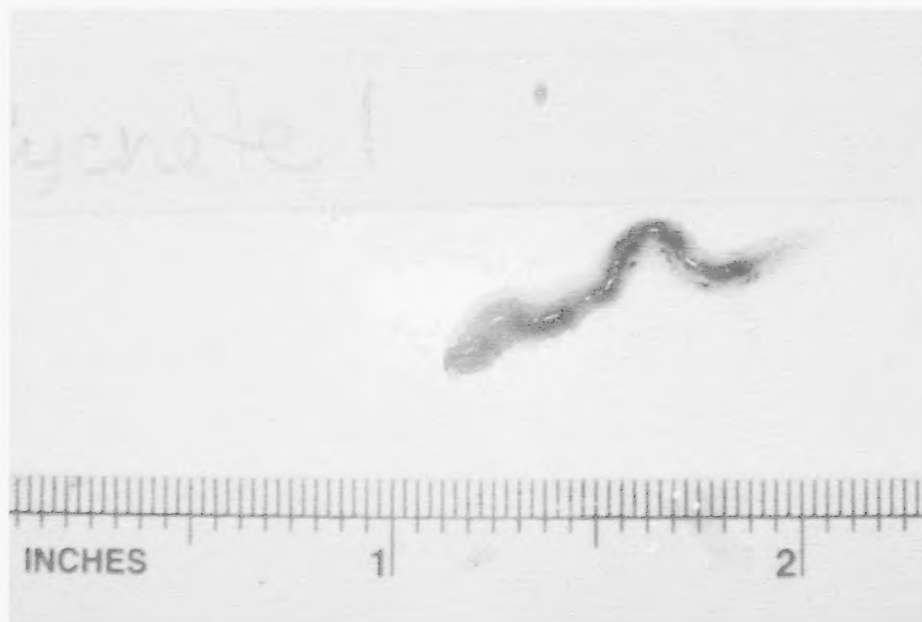
Polychaeta

Glycera capitata Örsted, 1843

AphiaID: 130118

MPO-QC: 5080

Photos: 2007



Onuphis quadricuspis M. Sars, 1872

AphiaID: 152306

MPO-QC: 5478

Photos: 2007



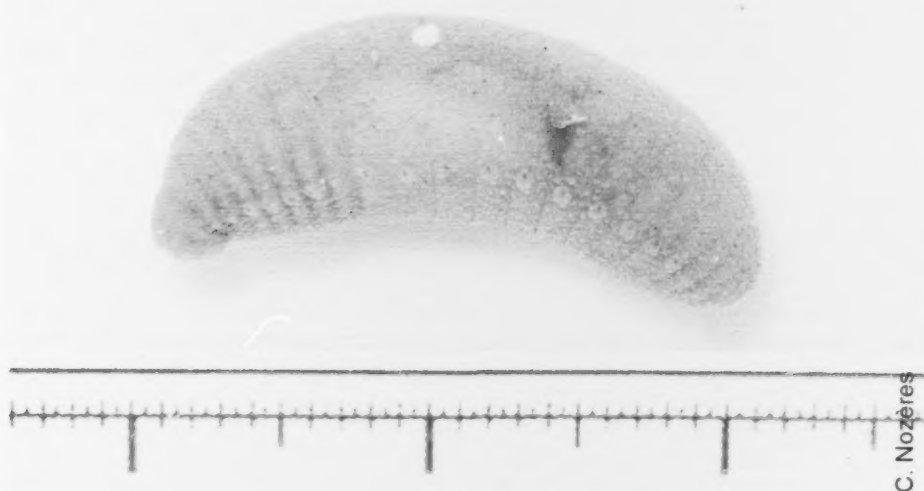
Polychaeta

Brada inhabilis (Rathke, 1843)

AphiaID: 130097

MPO-QC: 5755

Photos: 2006-2011, 2013



Cistenides granulata (Linnaeus, 1767)

AphiaID: 238377

MPO-QC: 5617

Photos: 2009, 2013



Polychaeta

Axionice maculata (Dalyell, 1853)

AphialID: 131484 MPO-QC: 5678 Photos: 2009



***Chone* sp.** Krøyer, 1856

AphialID: 129525 MPO-QC: 5806 Photos: 2007, 2009



Polychaeta

Melinna cristata (M. Sars, 1851)

AphiaID: 129804 MPO-QC: 5646 Photos: 2009



Polychaeta

Maldane sarsi Malmgren, 1865

AphiaID: 130305

MPO-QC: 5309

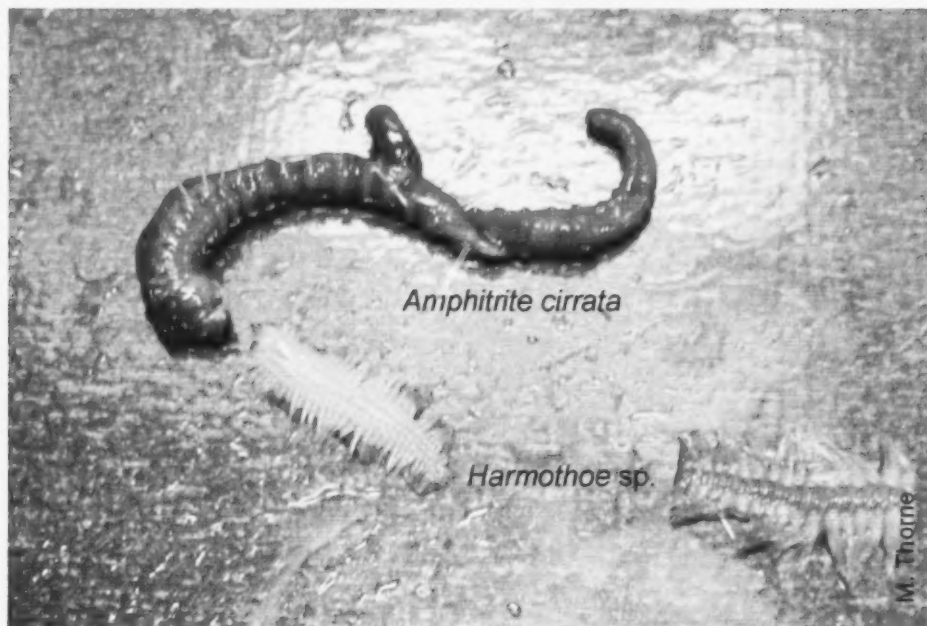
Photos: 2007-2009



Polychaeta

Amphitrite cirrata O.F. Müller, 1776

AphiaID: 131474 MPO-QC: 5675 Photos: 2008, 2009



Terebellides stroemii M. Sars, 1875

AphiaID: 131573 MPO-QC: 5690 Photos: 2009



Polychaeta

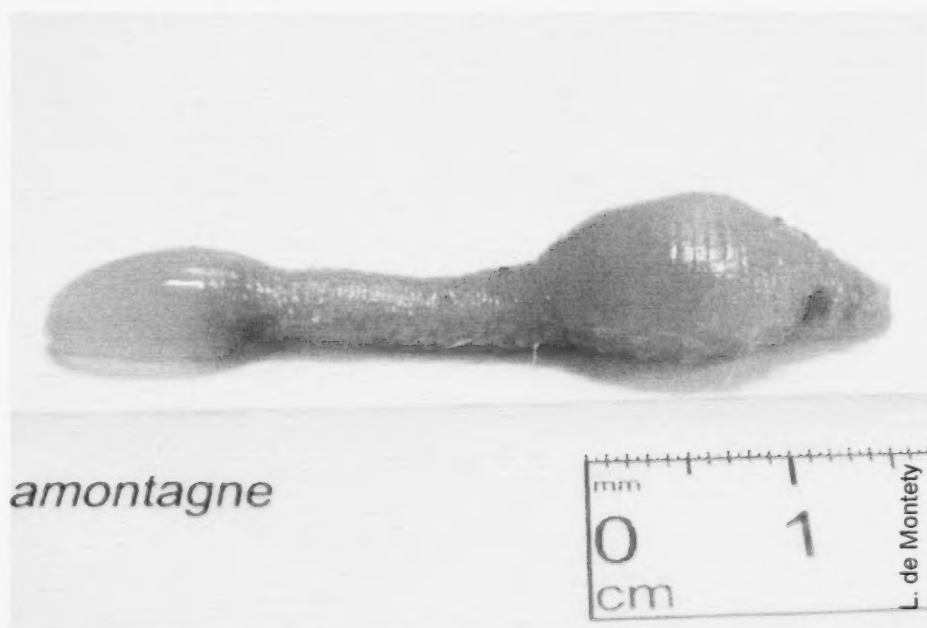
Polyphysia crassa (Örsted, 1843)

AphiaID: 130977 MPO-QC: 5264 Photos: 2006-2011



Scalibregma inflatum Rathke, 1843

AphiaID: 130980 MPO-QC: 5267 Photos: 2009
mistaken for *Polyphysia crassa*



Porifera

Asconema foliatum (Fristedt, 1887)

AphiaID: 172017 MPO-QC: 1120 Photos: 2007-2009, 2011-2013



C. Nozères

***Phakellia* sp.** Bowerbank, 1862

AphiaID: 131779 MPO-QC: 1116 Photos: 2011

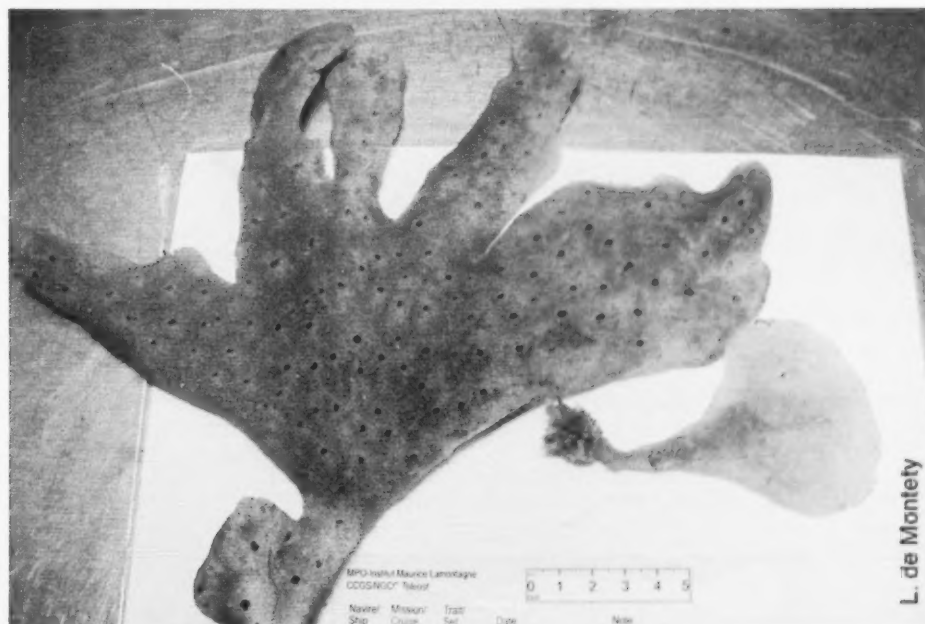


C. Nozères

Porifera

Isodictya palmata (Ellis & Solander, 1786)

AphiaID: 133247 MPO-QC: 1106 Photos: 2009, 2012, 2013
mistaken for *Halicondria* sp. (to verify)



Suberites ficus (Johnston, 1842)

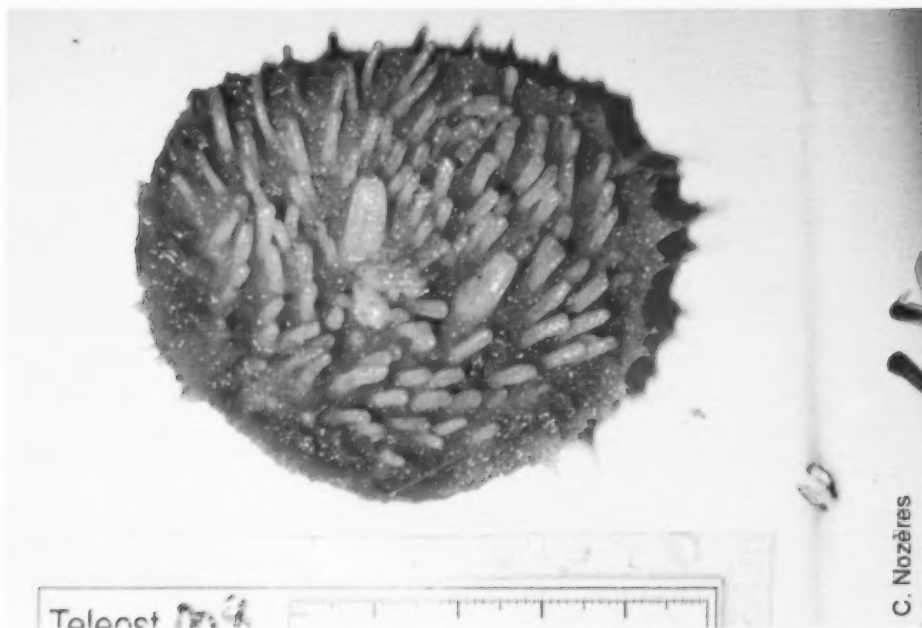
AphiaID: 134285 MPO-QC: 1115 Photos: 2007, 2011-2013



Porifera

***Polymastia* sp.** Bowerbank, 1864

AphialD: 132046 MPO-QC: 1109 Photos: 2006-2009, 2011-2013



Radiella hemisphaerica (Sars, 1872)

AphialD: 170674 MPO-QC: 1107 Photos: 2007-2009, 2011-2013



Porifera

Stylocordyla borealis (Loven, 1868)

AphiaID: 134240 MPO-QC: 1112 Photos: 2007-2009, 2011-2013
mistaken for Ascidiacea, Bryozoa, Hydrozoa



***Sycon* sp.** Risso, 1827

AphiaID: 131723 MPO-QC: 1113 Photos: 2009-2011, 2013



Porifera

***Tentorium semisuberites* (Schmidt, 1870)**

AphiaID: 134224 MPO-QC: 1108 Photos: 2007-2009, 2011



***Thena muricata* (Bowerbank, 1858)**

AphiaID: 134106 MPO-QC: 1114 Photos: 2011



Priapulida

Priapulus caudatus Lamarck, 1816

AphiaID: 101160 MPO-QC: 2573 Photos: 2011
mistaken for polychaete worms



Sipuncula

Golfingia margaritacea (M. Sars, 1851)

AphiaID: 175027 MPO-QC: 5902 Photos: 2006-2013



Sipuncula

Phascolion strombus strombus (Montagu, 1804)

AphiaID: 410749 MPO-QC: 5907 Photos: 2009, 2013



Turbellaria

Fecampiidae Graf, 1903

AphiaID: 142082 MPO-QC: 2295

Photos: 2012, 2013

egg cocoon of shrimp parasites

